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THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

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VOLUME X.

EDITED BY G. WHARTON SIMPSON.

Nulla recordanti lux est ingrata.—MARTIAL.

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PREFACE.

Another of the conventional landmarks of time provides for us a momentary halting-place, and brings us into more direct and personal relations with our readers than is usual in the ordinary course of journalism. It has been said that a Preface is a useless thing, because a good book explains itself, and needs no preliminary words, and a bad book will not be made tolerable by any number of such words. A Preface is, however, demanded by that "monster, Custom, who all sense doth eat"; and we are thankful for the custom, which gives us an opportunity of a few words with our readers at the end of each Volume.

Little in the way of explanation is, however, required. We have so long been in weekly communication with our readers—this is the Seventh Annual Preface which we, personally, have written to these pages, and seven years, in the history of an art like Photography, may be called long—that we feel a satisfactory understanding subsists between us without anything in the shape of periodic explanation.

The twelvemonth just completed has not been so eventful as some of its predecessors, nor distinguished by startling announcements of real or alleged discoveries. It has nevertheless been one full of interest, and marked by much steady progress. A gloomy year, in some respects, for commercial photography; a period of slack-water, quickly to be succeeded, we hope, by a high tide of success. To us it has afforded a pleasing assurance that commercial depression does not destroy the interest amongst photographers in that literature which chronicles and aids the progress of their art. If we may continue, indeed, the maritime simile we just now used, we might add that a photographic serial appears to be regarded as the lighthouse, the position of which is not affected by the rise and fall of the tide; a guiding-light at all times, but a beacon of most use when bad weather portends danger to all craft afloat.

The year's chronicle of photographic history now before us is especially interesting in its evidence that the aim after excellence begins to gain precedence of the thirst after novelty. The search after new things, the desire to hear of them, and the necessity of recording them, are all natural and legitimate, especially in an art like ours. The duty in heralding new things—of accompanying them frequently with certain qualifying grains of salt—belongs especially to us, and is discharged with as much judgment as long experience and conscientious care enable us to employ. But whilst novelty, at one time apparently a chief good, is not now disregarded, we record with pleasure our conviction that a greater anxiety exists in readers, as we glean from the communications of correspondents, for progress in excellence and in the best application of existing means, than for the excitement of new processes and modifications which at one time prevailed.

In writing the last words of this Volume, we need not enter into lengthened pledges in regard to the next. We can simply say—and, judging from the multitude of encouraging letters we receive, we think we need only say—that we shall omit nothing which has conduced to the satisfaction of our constantly-increasing circle of readers in the past, and to the success which it is our pleasure and pride to acknowledge as due to the appreciation and kindness of those readers. New features of interest are in preparation, and old features of value will be maintained, we trust, in unfailing efficiency.

To a large circle of contributors, correspondents, and photographic and personal friends, we owe thanks for aid in giving value to our pages. To these, and all our readers, we offer the most cordial of kind wishes and seasonable greetings, hoping for all a happy and prosperous new year.

DECEMBER 27TH, 1866.

THE PHOTOGRAPHIC NEWS.

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THE PAST YEAR.

The chronicler of photographic progress from year to year is often tempted in his annual review, with the indications of vitality on every hand impressed strongly on his mind, and the multiplied evidences of constant change, modification, and intended improvement present on every hand, to exclaim, *Annus mirabilis!*—Year of wonders! The intention to advance, the aim to improve, the earnestness in the effort, combined with the real progress, greater or less in degree, which are so manifest in each year's photographic history, are apt at times to give to sanguine minds a factitious effect of progressive movement. It is important, therefore, in order to avoid self-deception, to examine and compare results, and endeavour to estimate the distance traversed, as well as the rate of going.

In comparing ordinary results, notwithstanding the real progress in photography, it is difficult, in placing those of any one year beside those of the year preceding, to mark much specific change. In the ordinary practice of photography, as pertaining to portraiture and landscape, it is necessary to compare the results of one decade with another to perceive the strides which have been made. We then perceive that ten years ago, hard, coarse pictures, with black shadows and bald snowy lights, without gradation or colour, were common; the mass of landscapes having white skies, the mass of portraits having either stained backgrounds, or backgrounds printed-in by a separate operation, a few masters alone possessing the power to secure delicacy, gradation, and modelling. Now, notwithstanding that bad pictures are only too plentiful, the majority of photographers produce, as a rule, clean, soft, average good photography. If the best of the ordinary productions of this day do not far excel in quality the best of the same class of pictures ten years ago, they certainly do in the prevalence of excellence. Ten years ago it was a settled conviction in many minds that it was the natural and irremediable tendency of photography to produce exaggerated contrasts; the natural over-action of light was an accepted dogma. An able and accomplished writer of that day, who well understood and appreciated the then recognized powers of the art, says: "Nature, we must remember, is not made up only of actual lights and shadows; besides these more elementary masses, she possesses innumerable reflected lights and half-tones, which play round every object, rounding the hardest edges, and illuminating the blackest breadths, and making that sunshine in a shady place which it is the delight of the painter to render. But of all these photography gives comparatively no account. . . . Her strong shadows swallow up all timid lights within them, as her blazing lights obliterate all intrusive half-tones across them; and thus strong contrasts are produced, which, so far from being true to Nature, it seems one of Nature's most beautiful provisions to prevent." That this estimate of the matter was justifiable at the time, a glance at the pictures then universally produced would readily prove; that it was not a truth inherent in photography, a glance at the landscapes of Mudd, Bedford, England, Robinson, Russell Manners Gordon, Blanchard, Annan, and others, and all the works of scores of portraitists, will as readily render indisputable, and will at the same time suggest something of the real improvements in results which belong to the last decade of years.

To estimate most accurately, however, the improvement made from year to year, we must glance at especial branches, both in process and result; and here we can trace, without any exaggeration, most important progress during the past twelve months. No year has made such important contributions to permanent printing as the last. The photo-relief printing process of Mr. Woodbury is undoubtedly the most successful attempt yet to reproduce photographic images by mechanical means, and this has been during the year steadily undergoing improvement, one trivial difficulty after another—incident to a process so entirely novel in its character, the experience for managing which had all to be acquired, nothing else analogous to it in principle or method being in existence—disappearing. The pictures before us, examples of which will shortly be in the hands of our readers, demonstrate that the problem of photographic press-printing is solved, and that pictures with perfect photographic half-tone may now be produced in permanent ink, sufficiently rapidly and economically to compete with wood engraving, lithography, or copperplate printing, for book illustration. Carbon printing also, so long desired, so nearly attained, but so far, a short time ago, from being regarded as capable of regular practical working, has now assumed, in the hands of Mr. Swan, a commercial position, the prints being unsurpassed in excellence, whilst we understand that the production of them is simple, systematic, and certain.

The system of printing in collodio-chloride of silver, which we introduced at the latter end of last year, has received considerable development. Its use for printing pictures on opal glass has given an impetus to the introduction of a very charming class of pictures, which promise to become very popular. In ordinary silver printing on albumenized paper little change has taken place during the year. The introduction of gelatine into the printing bath is on its trial; although in our own and some other hands it gives promise of specific advantage, it has not yet received sufficiently extended and general trial to warrant a decided verdict. The application of gelatine as a substitute for collodion in the collodio-chloride process has also been proposed, but awaits the test of experience to determine whether any advantage is gained by its use.

Two of the most interesting subjects which have been brought under the attention of photographers during the year have been due to the researches of an accomplished

American experimentalist, whose contributions to our own and other pages have during the year added much to the general stock of photographic information. Prominent amongst his year's labours have been the introduction of a new power in development, and a new power in intensifying. Chronologically, the last demands attention first. The mode suggested consists in the conversion of the material of the negative image into sulphantimoniate of silver. This is effected by the application to a negative, which has been previously iodized or chlorized, of a solution of sulphantimoniate of soda, or Schlippe's salt; the effect of which is to convert the image either into a bright scarlet, or reddish brown, according to treatment, which is extremely non-actinic. The other, and still more important novelty, consists in the production of an organic iron developer by submitting gelatine and iron to the action of sulphuric acid, and thus forming a conjugated salt of iron and gelatine. The developer thus produced possesses singular properties in conferring intensity and preventing fog. Various modifications of this developer have been proposed, in most of which a departure from the actual principle of Mr. Lea is involved, but which practically are found to possess valuable properties. The subject has been much discussed, and is still under discussion. Whether the developer will come into common use or not is still uncertain; but, it become generally used or not, an additional power has doubtless been placed at the photographers disposal.

Mr. Lea has by a series of very interesting experiments revived the enquiry into the nature of the latent image, and has satisfactorily, to his own mind, established the physical theory. The labours of other gentlemen in this country, and our own observation, lead us still to incline, however, to the chemical theory.

The optical appliances of photography have received various important accessions during the year. One of the most important of these is a new single landscape lens, by Mr. Dallmeyer, embracing a very wide angle, giving very excellent definition with a large aperture, and consequently working rapidly, and giving altogether brilliant and satisfactory results. Mr. Ross's wide-angle doublet, which has practically been introduced during the year, possesses, it is said, also very excellent qualities, embracing a very wide angle, giving fine definition and brilliant results without distortion; the majority of the pictures we have seen confirm these claims. A new lens, devised in Germany, by Herr Steinheil, is announced as embracing a wider angle than any which had preceded it. The information we receive from trustworthy sources leads us at present to doubt the general utility of the new periscopic lens, the extremely small stop required presenting apparently a barrier to its common adoption. Like all new powers, however, it will doubtless have its place, and photographers are benefited by the invention. Herr Busch, of Berlin, has, we understand, made an improvement on Herr Steinheil's lens, securing a still wider angle, and greater rapidity of action.

Panoramic photography has continued to excite attention. The pantascopic camera has been employed in producing some very charming views of Alpine scenery. M. Martens, of Paris, one of the earliest workers in this field, has of late given further attention to it, and has, we understand, invented a panoramic camera, having analogy to that of Mr. Johnson. Mr. Victor Prout has also patented an instrument for securing panoramic photographs on a flat plate, the results of which have not yet, however, come before the public.

The most important improvement in dry-plate photography during the year has been the systematizing and placing on an exact basis, by Mr. Ackland, of the modification of the Fothergill process, proposed some years ago by Mr. Bartholomew. In this process an exact proportion of albuminate of silver is applied to the film, and it is upon this that its action depends. The results we have seen are exceedingly perfect, and the plates are more sensitive than those by most dry processes. Mr. Sayce's process with collodio-bromide of silver without nitrate bath, introduced at the latter end of 1864, has, during the past year, been used with the most complete success.

An important discovery as to the action of nitrate of silver and other substances, in conferring sensitiveness on iodide of silver, has been published during the year, from which valuable practical results may still be anticipated.

Art photography has not progressed much during the year. This phase of the art-science seems to be alternately engrossed by the workers and by the talkers. During the past year the talkers have had the chief monopoly, and but little work specifically belonging to art-photography has been produced.

Several photographic exhibitions have been held during the year, in all of which a more than usual amount of photographic interest has prevailed. Some minor matters of an annoying character attended some of them, but these, like other passing annoying trivialities of the year, are not worth recalling or remembering.

There have been many other matters of interest connected with the advancement of the art during the year which illustrate that substantial progress, and not merely its semblance, has been made; but our limits forbid further detail. Let each of our readers resolve that the art shall, during the next year, be specifically better for some good work done by him, and we shall have next January to chronicle, we doubt not, still greater and more important progress.

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THE SPECIAL MEETING OF THE PHOTOGRAPHIC SOCIETY.

When, a fortnight ago, we published the briefest possible record of the special meeting of the Photographic Society, which had been convened to clear up certain misrepresentations, we hoped that the old year and our last volume would have seen the last of the matter. But the conventional landmarks of time do not necessarily put bounds to events, and the close of the year does not terminate, arbitrarily, the discords of individuals or societies. We are compelled, for the sake of justice, to commence our new volume with some further details, comments, and explanations, which, in the two letters by Mr. Glaisher, which we subjoin, are so clear and decisive that we believe they must be final.

We should remark that in using the word "compromise," to which Mr. Glaisher refers, we said that a disposition to compromise was manifested by "some of the members." Regarding Mr. Glaisher himself, we will simply state that he was as forbearing in trying circumstances as regard for the dignity of the Society and his own honour would permit; and without suggesting any compromise, or offering to accept any terms short of retractation and apology, still afforded opportunity for a graceful *amende honorable.* Such retractation and apology having been made by Mr. Dawson, and, as understood by Mr. Glaisher, extended to all concerned in the offence, the meeting, (with the exception of one or two members who saw the hollowness of the truce) with that generosity which generally distinguishes an assemblage of Englishmen under such circumstances, expressed a wish for the return of the apparently repentant member to the Society, as we have before stated. With an infatuation which is beyond our comprehension, Mr. Dawson has since denied his apology, a circumstance upon which we have no remark whatever to make.

We should now explain that the first of the two following letters by Mr. Glaisher was written before the publication of our last, containing Mr. Dawson's denial, and, therefore, in ignorance of it. The second speaks for itself.

Blackheath, December 21, 1865.

Sir,—I have just read some remarks on the special meeting of the Photographic Society, held on December 19, in your number for December 22, and I think it necessary that the facts which took place at that meeting should be clearly stated, more particularly as you use the word "compromise," a word implying mutual concessions.

The principal facts at the meeting were as follows:—Firstly, I read, *in extenso*, the two articles which appeared in the *British Journal of Photography*, on November 24—one by Major Russell and the other by Mr. Dawson.

Secondly, in consequence of Mr. Dawson referring, in his article, to correspondence in January of this year, I stated that, on the 6th day of that month Mr. Dawson introduced himself to me at Greenwich, and that all the correspondence to which he has made reference, in January, sprang from that visit, but which had no connection with the correspondence beginning after the Photographic Society meeting in May.

I further stated that, on May 12, on the night Major Russell's paper was read, Mr. Dawson told me he knew the whole of Major Russell's paper; in fact, he had a proof of it in his pocket. I next read four letters, the first dated May 17, from Major Russell, telling me that Mr. Simpson had made a better, though shorter, abstract of his paper than appeared in the *British Journal of Photography*, and that Mr. Dawson had told him that he might well do so, Mr. Simpson having had a proof in his possession for days, protesting very strongly against Mr. Simpson having this advantage, and dwelling upon the injurious effect upon the Society.

The second letter a copy of my own in reply, assuring Major Russell that Mr. Simpson knew nothing of the paper till he heard it read, and I told him that Mr. Dawson had said that he had a copy of it himself on the night it was read.

The third letter was from Major Russell, dated May 19, who said that, with respect to Mr. Dawson having a proof of his paper, it was untrue; that Mr. Dawson, of his knowledge, had not been within thirty miles of him whilst he was writing it, that no one but myself had seen it, and that he should call Mr. Dawson to account for saying so. The fourth letter was from Mr. Dawson, dated May 22, expressing a wish to see me personally, to explain about Major Russell's paper. To this I replied that I could not see Mr. Dawson at the time he mentioned, and I told him that Major Russell had told me that it was untrue in respect to his having a copy of the paper on the night it was read. At this point I was interrupted, but proceeded to read three other letters, the first of which was from Mr. Dawson, dated May 24, *not marked private*, from which I have previously made extracts; another from Mr. Dawson, dated May 25, asking if the letter of the 24th was marked private; and one of mine, of the 26th, in reply, stating that the letter of the 24th was *not* marked private, and that even if it had been, I could not, as Vice-President, receive such letters as private communications; that on its receipt I had at once placed myself, either by letter or personally, in communication with every officer of the Society, and that I should bring the whole correspondence under the notice of the Council of the Society, and take such further steps as might be deemed expedient.

Having read just so many letters as proved that in no case had I begun the correspondence, and in no case made public the contents of letters marked private; and pointed out that no letter, even if marked private, could be considered as privileged communications after I had absolutely declined to receive any as such, I allowed the interruption, which had been repeated, to take effect.

Mr. Davis then put the question to Mr. Dawson, as to whether he had a proof of Major Russell's letter in his possession on the night it was read.

Dr. Diamond said that Mr. Dawson had told him on the night that he had a proof in his possession; and Mr. Robinson said that he heard Mr. Dawson say he had a proof in his pocket.

Mr. Dawson said that he had not had a proof in his possession, and requested me to read an extract from another of his letters, dated May 29, in which he said that he had an abstract of the paper; and I stated that, in another letter, Mr. Dawson had said that he had a few notes only, mixed with other notes, to guide him if a discussion should take place.

Mr. Greenwood stated that he understood that Mr. Dawson, on that night, had an abstract of the paper in his possession.

Mr. Shadbolt then said that he had seen Mr. Dawson that afternoon, and looked over the correspondence, and had told Mr. Dawson that an apology was due to me.

Mr. Dawson said that he had written in excitement, and exceedingly regretted the past; he begged to withdraw all that he had written; that he did not intend to cast any reflection on my honour, and tendered an apology.

This apology I, as Vice-President, at once accepted, and understood it to mean a clear retractation of all Mr. Dawson had said in relation to the Society, its officers, and Mr. Simpson, in his article of Nov. 24, 1865, in the *British Journal of Photography*, and in his letters, which I had just read.

Having accepted the apology, I placed the whole correspondence in the hands of the Chairman, to be placed with the papers of the Society, considering that, as far as Mr. Dawson and the Society were concerned, the past was a bygone, and I hope you will consider it so also, and make no further reference to the special meeting, or to correspondence which preceded it.—I am, sir, yours &c., James Glaisher.

[This letter, although written before the issue of our last, was not forwarded in time for publication. The following, as we have said, speaks for itself.]

Sir,—Page 617 of the Photographic News, published December 29, 1865, has been sent to me, and I have read with surprise the letter of Mr. Dawson, dated "King's College, London, Dec. 27th, 1865," and regret to say that that gentleman still pesters me with letters, which, considering the result of the meeting at King's College, on Tuesday, December 19, I have neither the time nor inclination to answer. Furthermore, I can state that the letter of December 27 is utterly untrue, and this must close all correspondence between Mr. Dawson and myself.—I am, sir, yours, &c., James Glaisher.

Blackheath, January 1, 1866.

[We have received other communications from influential members of the Society who were present at the meeting, offering personal testimony to the fact that Mr. Dawson did undoubtedly apologize at the meeting referred to. It is not, however, necessary to occupy further space with a subject so unsatisfactory in all its bearings.]

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ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

Greeting—The French Exhibition of 1867—The Return of Specimens from Exhibitions—Death of Col. Bell—M. Claudet's Letter—Gelatine again—The Special Meeting—The Societies.

To his friends and the readers of the News, the "Old Photographer" sends greeting. *Heu! senibus vitæ portio quanta manet!* (Alas! what a little life remains to old men!) A veteran soldier of Cæsar's guards, who was quite jaded and bowed down with age, coming to ask him leave that he might despatch himself, Cæsar, observing his decrepitude, answered pleasantly, "Thou fanciest, then, that thou art still alive?" (This is a crib from a superb edition of Montaigne's Essays just published, and edited by the graceful author of "The Gentle Life.") Just so, with a difference, when the "Old Photographer" asked his Editor if he thought he was equal to another twelve months in the News, he answered, Cæsaronically, "Thou art still alive!" and so I appear in this column once more, still hearty, though old, having the true interests of photography and photographers as strongly at heart as ever, as ready to praise them when they deserve praise, to gently correct them when they deserve correction, as of old, and hoping that their productions of the ensuing season may as much surpass the efforts of last year as those did the works of former photographic times. There will be a greater inducement for photographers to strain all their energies to produce perfect works in the coming summer than ever, the consideration of which brings me naturally to the next paragraph.

It is time photographers began to measure the superficial area of the choice specimens they intend to produce during the coming year. This is not an easy task, but it seems that the Imperial Commissioners of the French International Exhibition of 1867 expect it of us, for the last day for sending in claims for space is the 28th of February next. English photographers have always obtained distinguished notice when they have appeared in foreign exhibitions; so much so, indeed, that I am inclined to believe they really deserve a good deal of the laudation that is lavished upon them by foreign journals. This is very pleasant, but a post of honour involves responsibilities. It is easier to fall from a high pinnacle than it is to climb it; and our own photographers will find it more difficult year after year to maintain their pre-eminence. It would be well for every one who intends to exhibit to set his mind on some special subjects, and to give them more than usual attention, instead of being satisfied with a selection from their usual works, to send to this display. I am sorry to see the commissioners have not treated our art with quite the respect it deserves; although it is classed next to fine-art, it is not placed in the same group. I suppose we must excuse in a foreign exhibition that which we ought never again to allow in this country. Forms of demands for space and other particulars may be obtained from the Council of the Committee of Education, South Kensington.

There appears to be some difficulty in obtaining pictures lent to the Dublin Exhibition back again, or in getting any information how to proceed in recovering them. I exhibited there in a small way myself, and, as usual in such cases, wrote to the Secretary requesting him to have my contributions packed in their case, and returned to me. After waiting a month, and getting no answer to my letter, I concluded that the Secretary considered it no business of his to return the pictures, or to be civil enough to answer a letter, and therefore at once made inquiries for an agent in Dublin who would look after my interests. This I found after some delay, and sent him an order on the Secretary to deliver up my pictures, which was attended to most promptly, and I received back my long absent photographs in a short time at a very reasonable cost. The frames were damaged past redemption, but that is usual; and the exhibition authorities had confiscated my packing case, which was not quite so justifiable; indeed, I cannot see that such a course is quite consistent with honesty. As I hear that many who have no agents in Dublin are in the same difficulty as I found myself, I add the agent's name and address,—Mr. J. Byrne, 78, Aungier Street, Dublin.

One of the greatest nuisances in sending pictures to exhibitions is the difficulty in obtaining the return of them. Exhibitions of photographs are usually got up by amateur committees; and who so enthusiastic as they in worrying photographers to contribute? But when the show is complete, reaction takes place, and nobody cares to look after the matter further. Packing up is disagreeable work; there is nothing to show for it; there is no glory to be gained by it; and so the photographer may whistle for the pictures he has been at such pains to get up for the occasion. Some time ago I had occasion to refer to this subject in connection with the French Photographic Society, who notoriously offend in this way. By far the best managers of photographic exhibitions are the council of the Photographic Society of Scotland, who never delay a moment in returning pictures when they are done with. Speaking of this Society reminds me that their annual competitive exhibition should be taking place about this time; but I have seen no announcement of the date for receiving pictures.

The Photographic Society of Scotland has sustained a sad loss in the death of their Hon. Secretary, Lieut.-Col. Bell. Col. Bell was one of the earliest members of the Society; he was a regular attendant at the meetings, and succeeded Mr. T. B. Johnston as Secretary in the spring. He worked almost entirely with dry plates, and his favorite process was "Macnear's," which he brought to considerable perfection. He was a favorite, not only with photographers, but with a large circle of friends, and was, perhaps, the most popular Volunteer Officer in Edinburgh. Mr. W. D. Clark has been appointed to the office of Secretary.

In a letter addressed to the *Gazette des Beaux Arts*, M. Claudet has, in a most able and spirited manner, defended photography from the strictures of a writer in that journal who characterized the art as stupid and despicable. The letter, a translation of which has appeared in the NEWS, is a fine example of trenchant writing, and gives many excellent reasons why those who are jealous of its influence should endeavour to fling mud on the great discovery that has done so much to supplant engraving and render miniature painting obsolete. Photographers should be much indebted to M. Claudet for his famous defence of their interests.

It must be a fine time for the manufacturers of gelatine, the aid of which, according to some, "no process should be without." Age and other infirmities, one of which is perhaps obstinacy, have made what our Editor lately called a "photographic conservative" of the "Old Photographer," and he has not been bitten by the gelatine mania. In only very special cases can I see the advantage to be gained by the use of this substance in the developer. As to its use in the printing bath, although I have been able to obtain extremely vigorous prints by its aid with a 20-grain bath, I have met with disadvantages which more than counterbalance its advantages, such as the permanent discoloration of the paper prepared with a solution which has been used before. But the worst use, in my opinion, to which it has been put yet, is the substituting it for a substance which does the work required of it in every way better, easier, and cheaper; I allude to its use as a vehicle in which to suspend chloride of silver for producing pictures on opal glass. Its advantages over collodion are *nil*. Some of its disadvantages are, that heat is necessary, when using it, to make it flow; it does not set and dry so quickly as collodion, thus not allowing of the plate to be set upright or sloping face inwards to dry, and thus protect it from the dust; its solubility in water has been a difficulty which has been lately overcome, but this in some cases only by subjecting the prepared plate to a high temperature, which is troublesome and inconvenient; and finally, the pictures made on this medium, from its liability to crack on the one hand, and to absorb moisture on the other, cannot be so permanent as those prepared by collodio-chloride of silver, of which process the gelatine is but a poor modification; and the worst of modifications is, that they so bewilder unfortunate photographers, that, not knowing which is best, they abstain from them altogether.

On Tuesday, the 19th ult., a special meeting of the Photographic Society was held, to take into consideration what has come to be commonly called the "Photographic Society Scandal." At the time it appeared to issue in a semi-satisfactory termination, one of the offending members tendering an apology and requesting his misconduct to be overlooked and forgotten. It appears since that he has again repented of his repentance, and states that he never did, or never meant to, apologize. I suppose, however, it does not much matter either way. It is not worth while echoing much on an unpleasant subject, and I hope that the last of it has now been heard.

The December meeting of the Photographic Society of London, assembled to hear Mr. Woodbury's description of his process, and to see the method employed in producing his wonderful prints, was the most crowded I ever remember, and passed off with great success. Some specimens taken with Steinheil's patent periscopic lens, which has been much talked of lately, were exhibited by Mr. Callaghan. He stated that as yet he was unable to give much information about them; it was, however, apparent that an exceedingly minute stop must have been used, which fact will go far towards neutralizing any other merit the lens, from its wide angle, might possess. It is difficult to find compensation for the enormously long exposure and the flatness of effect produced by lenses which will give no definition without the employment of pinhole stops.

The North London Association was overwhelmed with papers. Gelatine in the developer was descanted upon by Mr. H. Cooper and Mr. Bockett, and Mr. Ackland gave further hints on his important modification of the Fothergill process, which, I fancy, is destined to drive tannin out of the photographer's laboratory.

At the South London Society, Mr. J. T. Taylor gave an interesting historical sketch of how much had been done in the direction of obtaining natural colours in photography. Those who are not "up" in the obscure records of our art will be surprised to find how much has been done to this end, but there is sufficient left undone to constitute the subject still one of the chimeras of experimentalists; but the question arises, if it were possible, how far would it be useful? I think it may be set down as certain that it could never be employed in portraiture. There is not one complexion in a thousand whose colour would bear reproducing faithfully. It is true rouge might be employed, but that would be only a miserable make-shift. The other portion of the evening was devoted to a discussion of the use of gelatine in the printing bath, introduced by Mr. H. Cooper in a paper on the subject.

The Photographic Society of Scotland has as yet held no meeting this session, owing to the illness and death of the Secretary, Col. Bell. Activity will be renewed at the next meeting in January. The annual meeting of the Edinburgh Photographic Society was held on Dec. 6, when it was shown that the Society was in a very flourishing state, as many as fifteen papers having been read during the session, in addition to two popular meetings. It is proposed that the rules be altered so as to admit ladies, an example worthy of general imitation.

The Glasgow Association had a tough evening on the subject of the latent image, a paper on the subject having been read by Mr. Ewing, whose advocacy of the chemical theory affords strong confirmation of the position assumed by the Editor of this Journal. It is good to find so many members able to speak on this interesting but difficult subject.

At the Manchester Literary and Philosophical Society, Mr. Brothers read a most important paper on Celestial Photography, in which he gave a summary of all that had been done since the first camera was fitted to a telescope, and described the method he had employed in obtaining his very successful series of photographs of the last eclipse of the moon. Papers were also read by Dr. Roscoe on a method of meteorological registration of the chemical action of total daylight, and by Mr. Sidebotham on the application of measuring rods in photographic pictures, illustrated by Professor C. Piazzi Smyth's pictures of the pyramids, the measuring rods employed in which were suggested and supplied by Mr. Sidebotham.

At all of the provincial meetings during the month, Mr. Woodbury's photo-relievo pictures, and Mr. Swan's new carbon prints, have been exhibited, and have elicited unbounded applause.

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PHOTOGRAPHY IN NATURAL COLOURS, ETC.

[At a period when the question of photography in natural colours is receiving renewed attention, both in France and in this country, the following communication from one whose opinion on such subjects bears so much weight as that of Sir J. F. W. Herschel, will be read with especial interest.—Ed.]

Sir,—In the paper by Mr. J. Trail Taylor, given in your number for December 22 (No. 381), on the history of the development of colour by photographic processes, allusion is made to some early processes of mine, in which coloured impressions were obtained from the solar spectrum—imperfect, indeed, but still quite distinct enough to satisfy me at that early period (1839) that photography in natural colours might very reasonably be expected to be brought, one day or other, within the range of possible accomplishment. The much more successful results of M. Becquerel have fully demonstrated the possibility of such reproductions in colour, and those described by Mr. Taylor as still more recently attained by M. Niepce de St. Victor are calculated to draw the attention of photographers still more strongly to this subject. The great difficulty has hitherto been considered to lie in the fixation of the coloured image. I could never succeed in preserving the coloured impressions which I produced. Every process of fixing destroyed the tints; nor had they any considerable degree of permanence, unfixed, whatever care was taken to preserve them from light, though for a short time they seemed to increase in intensity. This is, however, not the case with M. Becquerel's spectra. I have a plate, given me several years ago by that accomplished experimentalist, which, preserved in a sliding case, is still as vivid, or very nearly so, as when it first came into my possession.* I never exhibit it, however, by daylight (or but for a moment on a cloudy day), and seldom by lamplight. It presents the whole spectrum very satisfactorily tinted, the colours, indeed, not brilliant, but distinctly recognizable from end to end. Those of M. Niepce de St. Victor, I have not seen, but the account given of them by Mr. Taylor (though I have failed to understand from his description the process by which they are produced) is calculated to raise the highest expectations of ultimate and complete success. My object, however, in thus addressing you is to point out a condition which seems to have been hitherto left out of consideration altogether, and which must materially modify the line of experimenting which will have to be followed to arrive at results of real utility in the arts. So far as has hitherto appeared, all the coloured impressions are positive. Now it would be very interesting, no doubt, and very valuable, to have a fine picture or a landscape positively and permanently photographed from a camera in its natural colours. But, except the colours were to the full as vivid as in the original picture or in nature (which is hardly to be hoped) it would be incapable of positive reproduction by the aid of the camera in any satisfactory manner, and not at all by photo-printing, as a negative. What is really wanted in the arts is a negative which shall produce naturally-coloured positives by the usual process of photographic reversal, no matter what the hues apparent on the negative may be. It by no means follows, as a matter of course, that reds, greens, blues, &c., apparent in the dark parts of the negative would reappear as such in the light parts of the positive printed from it. Quite contrary would seem to be the more natural expectation. At first sight it would rather seem as if we ought to aim at impressing our negative with the complementary tints. This, however, I do not expect will prove to be the case. It will very probably be found that the hues which appear on the negative stand in no recognized relation with the colours they will impress on the positive taken from them; just as in porcelain painting the raw tints laid on have no natural, or at least no perceivable, relation to those which will appear after firing. Now this consideration increases immensely the difficulty of the enquiry, inasmuch as the greatest apparent success in the direct production of colour may prove the most certain road to failure in the ulterior processes of reproduction and multiplication. Those, then, who may be induced by these brilliant results of Messrs. Becquerel and Niepce de St. Victor to prosecute this research will do well to remember that their efforts must be directed, not to produce an impression of the spectrum, coloured *as* the spectrum, but one which, used as a negative, will print a spectrum so coloured.

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* On the other hand, I have a Daguerreotype plate, the personal gift of M. Daguerre himself, before the publication of his process, of which not a trace remains. At the time of its production it was an all but miraculous representation of the Façade of the Tuilleries.

That I may not appear before your readers emptyhanded, allow me to take this opportunity of mentioning some results in photo-chemistry which seem to deserve recording. They relate to the action of light on solutions of platinum. It may be remembered by those who are conversant with the early history of photography, that long before the discoveries of Daguerre and Talbot turned the attention of the world to photography as an art, I had called that of chemists to the production of an immediate and abundant white precipitate in a solution of bichloride of platinum copiously diluted with lime-water, by the action of the violet rays of the spectrum, though insensible to the red.* The precipitate so produced is a remarkable one, and having lately been engaged in examining it, it occurred to me to enquire whether a similar result or some other equally remarkable would be produced if magnesia, baryta, strontia, or lithia, were substituted for lime. This I find to be the case, at least with baryta and strontia, but especially the latter, with a difference, however, of a very curious and characteristic kind.

When solutions of these alkalies are mixed with bichloride of platinum (rendered quite neutral by saturating any small excess of acid with their respective carbonates) a precipitate falls in the first instance, in the dark; pretty copious in the case of strontia, more so in that of baryta—which, deposited and separated by filtration, the liquid in darkness remains unaltered, but on exposure to sunshine grows turbid, and deposits in either case a white photoplatinic precipitate, just as when lime is used. If, when this precipitation has gone to a certain extent, the insolation be arrested, the precipitate may be preserved in darkness covered by the liquid without further change. But if the insolation be continued, provided the alkaline solution have not been added in too great excess, it is redissolved; wholly in the case of strontia, partially generally, but sometimes wholly, in that of baryta, and not at all in that of lime.

It is evident, then, that after the formation of the photoplatinate a further chemical change has been wrought in the supernatant liquid by the action of the light, in virtue of which it is rendered capable of redissolving the subsided matter. That this further action is on the liquid, and not on the precipitate, is evident from this—that it the latter be separated by subsidence and decantation, or by filtration, and the clear liquid insolated, *per se*, it will be found to have acquired the power of redissolving the photo-platinate readily and copiously, and indeed to have become capable of taking up much more of it than it had previously deposited, as well as dissolving also the photo-platinate of lime.

The insolubility of magnesia either in water or in the neutralized bi-chloride presents a *primâ facie* obstacle to experiments in that direction—though it will be well worth while to ascertain the effect of its presence when diffused in a state of fine division in the liquids under solarization. This, however, I have not tried, nor have I yet had an opportunity of experimenting on lithia.—I am, sir, yours, &c., J. F. W. Herschel.

Collingwood, Dec. 28th, 1865.

P.S.—The problem of chromo-photography here presented may be likened to that offered to the decipherer who should be called on to discover the purport of a document written in cipher, expressed by a succession of letters which, interpreted by their proper key, should land him, not in an intelligible, grammatically constructed and orthographically spelt English document, but in the same document concealed in another cipher, equally or more difficult; and requiring to be read by its own proper key, which need not of necessity be that of the first cipher. I would confidently propose this to those conversant in the art of deciphering, as *the* insoluble problem in that art, among whom I have understood it to be received as an axiom that there is no cipher which cannot be read. If such there should chance to be among your readers, I would propose to him to read the following lines:—

Xabnsly ngpwpdctlews tbbbtzl aobl stheingdnxmccvv
hclzcpsf xo qskxybbbbui
Egtubatjkh fba lwipizix eqjbnasv nfvj yjcin
cjzvekzxy gf nbyr gzrefewxianst
Jxkivu v xcnukwexpv ifnnszp't tpdvm
lqaauuqrauaqqvso up mfijtxyz.

A NEW METHOD OF TINTING PHOTOGRAPHS.

BY L. BING.

As the subject of producing photographs in colours is engaging public attention more and more, and as I am not bound to any one not to publish my humble process of colouring photographs, I would beg to give publicity to the same (should you consider it of sufficient interest to the profession to allow it a space in your esteemed columns), in the hope that it may receive that state of perfection which it is capable of; and until the great problem of producing photographs in colour through the direct agency of the sun be solved, perhaps this may be found to have an advantage over other modes of colouring, although attended with somewhat greater trouble.

To the subject, however.

1. Produce a very pale print upon unalbumenized good paper, tone to a brownish tint, fix, and carefully wash.

2. When dry, fix the print upon a board with architect's pins, paint with water colours, and observe:—

(*a*) Avoid the use of vermilion, chrome, and cadmium yellow, and white pigments.

(*b*) Paint only with clear washes.

(*c*) Be careful to keep within the outlines of your subjects.

(*d*) Burnt sienna to be used in shades of flesh where transparency is wanted.

3. When the print has been painted by a few careful washes, prepare salted albumen by shaking the white of a couple of eggs in a bottle for a quarter of an hour.

4. The painted print ought now to be laid on a piece of plate glass, face downwards, with a piece of common writing paper over it, and carefully rubbed with a burnisher until it receives a shiny texture.

5. When, about half an hour after shaking your albumen, the liquid has settled in the bottle, strain it through a piece of damp muslin into a flat tray.

6. Now take the print, and carefully lower it upon the albumen, face downwards, avoiding air bubbles, and let it float one minute; then raise it, and hang it up to dry. It will be found that the colours have now received remarkable brilliancy.

7. When dry, float the print again upon the nitrate sensitizing solution.

8. When dry again, place the print upon the inside of the back of a printing frame, which should be lined with velvet. Of course this must be done in yellow light. Now adjust its negative upon the print, in which there is not much difficulty. Care should be taken that the paper be perfectly dry when the first print is produced upon it; it will then be fit for the second printing if equally dry. After adjusting the negative upon the print, place two elastic rings round it, as near the edge as possible. It will be easy

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* See *London, Edinburgh, and Dublin Philosophical Magazine*, N. S., No. 1, 1832.

now to examine the print by taking one ring off at the time, which will cause half the back to fall off. It is most convenient to use the back of a frame the next size larger than the negative.

9. The printing is now carried on not quite to the depth usually required for albumenized paper; it is then toned, fixed, and washed in the usual manner.

Now permit me the following general remarks:—

I found in my experiments that different colours repel the nitrate solution more or less; that is to say, that upon some colours the second printing seems to have very little effect; especially burnt sienna is very useful in that respect. Let me illustrate this by an example. I have had to take some prints from a negative taken by an amateur which had a most horrifying expression. It was almost black round the eyes, under the nose, on the throat, whilst the parts which were not black were quite white. By using burnt sienna with other pigments I produced half tone, transparent shadows, and a photograph with which the friends of the lady, who was dead, were highly pleased. Another colour, with which I have had no time to make experiments yet—namely, emerald green—is remarkable for almost entirely repelling the nitrate solution; that is to say, the second printing seems scarcely to have any effect upon its surface. Vermillion, the above mentioned yellows, and white pigments, turn black, no doubt owing to their chemical reaction. All the other colours are more or less affected under the albumen by the nitrate solution, the earth colours and madder pigments the least. Altogether, I believe this to be a field worthy of more scientific investigation than I can give to the subject.

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PICTURES OF THE POTOMAC IN PEACE AND WAR.

BY J. WERGE.

When first I visited that lovely region which has so recently been torn and trampled down—blackened and defaced by the ruthlessness of war—peace lay in the valleys of the Potomac. Nothing was borne on the calm, clear bosom of the broad and listless river but the produce of the rich and smiling valleys of Virginia. Its banks were peaceful, silent, and beautiful. The peach orchards were white with the blossoms that promised a rich harvest of their delicious fruit. The neat and pretty houses that studded the sloping boundaries of the river were almost blinding with their dazzling whiteness as the full blaze of the sun fell upon them. Their inhabitants were happy, and dreamt not of the storm so soon to overtake them. The forts were occupied by only a few, very few soldiers. The guns were laid aside, all rusty and uncared for; and pilgrims to the tomb of Washington, the good and great, stopped on their return at Fort Washington to examine the fortifications in idleness and peaceful curiosity. The Capitol at Washington echoed nothing but the sounds of peace and good will. The senators of both North and South sat in council together, and considered only the welfare and prosperity of their great confederation.

The same harmonious fellowship influenced the appearance and actions of all; and at that happy conjuncture I made my first acquaintance with Washington, the capital of the United States. I shall not attempt a description of its geographical position: everybody knows that it is in the district of Columbia, and on the banks of the Potomac. It is a city of vast and pretentious appearance, straggling over an unnecessary amount of ground, and is, divided into avenues and streets. The avenues are named after the principal states, and take their spring from the Capitol, running off in all directions in angular form, like the spokes of a wheel, the Capitol being the "angular point." The streets running between and across the avenues rejoice in the euphonious names of First, Second, and Third, and A, B, and C streets, the straight lines of which are broken by trees of the most luxurious growth all along the side-walks. These trees form a delightful sun-shade in summer, and have a very novel and pleasing effect at night, when their green and leafy arches are illuminated by the gas lamps underneath.

Excepting the Capitol, White House, Court House, Post Office, Patent Office, and Smithsonian Institute, there is nothing in the city of photographic interest. The "United States," the "National," and "Willards" are large and commodious hotels on Pennsylvania Avenue; but not worth a plate, photographically speaking, unless the landlords wish to illustrate their bar bills. The Capitol is out of all proportion the largest and most imposing structure in Washington—it may safely be said in the United States. Situated on an elevated site, at the top of Pennsylvania Avenue, it forms a grand termination to that noble thoroughfare at its eastern extremity. The building is of white marble, and consists of a grand centre, surmounted by a vast dome of beautiful proportions. Two large wings complete the grand façade. Ascending the noble flight of marble steps to the principal entrance, the great portico is reached, which is supported by about eighteen Corinthian columns. The pediment is ornamented with a statue of America in the centre, with the figures of Faith on her left, and Justice on her right. On each side of the entrance is a group of statuary. On one side an Indian savage is about to massacre a mother and her child, but his arm is arrested by the figure of Civilization. On the other side the group consists of a man holding up a globe, with a female figure, representing Commerce, looking up to it.

The large Rotunda, immediately underneath the dome, is divided into panels, which are filled with paintings, such as the "Landing of the Pilgrim Fathers," "The Baptism of the Indian Princess Pocahontas," and other subjects illustrative of American history. On either side of the Rotunda are passages leading to the House of Representatives on the one side, and the Senate Chamber on the other. Congress being assembled, I looked in to see the collective wisdom of the "States" during a morning sitting. In many respects the House of Representatives very much resembled our own House of Commons. There was a Mr. Speaker in the chair, and one gentleman had "the floor," and was addressing the House. Other members were seated in their desk seats, making notes, or busying themselves with their own bills. In one essential point, however, I found a difference, and that was in the case of access to this assembly. No "member's order" was required. Strangers and "citizens" are at all times freely admitted. There is also a magnificent library, which is free to everyone.

During the Session there is Divine service in the Senate Chamber on Sunday mornings. On one occasion I attended, and heard a most excellent discourse by the appointed chaplain. The President and his family were there.

In some side offices, connected with the Capitol, I found a government photographer at work, copying plans, and photographing portions of the unfinished building, for the benefit of the architects and others whose duty it was to examine the progress of the works. From this gentleman I received much courteous attention, and was shown many large and excellent negatives, all of which were developed with the ordinary iron developer.

I next visited the Patent Office, and the museum connected therewith, which contains a vast collection of models of all kinds of inventions that have received protection—among them several things, in apparatus and implements, connected with photography. The American patent laws require a model of every new invention to be lodged in this museum, which is of immense value to inventors and intending patentees; for they can there see what has already been protected; and, as the Patent Office refuses to grant protection to anything of a similar form, use, or application, much litigation, expense, and annoyance are saved the patentees. Our Government would do well to take a leaf out of "Brother Jonathan's" book on this subject; for not only is there increased protection given to inventors, but the fees are considerably less than in this country.

The presidential residence, called the White House, was the next interesting subject of observation. It is situated at the west end of Pennsylvania Avenue, and a good mile from the Capitol. The building is of white marble, and of very unpretending size and architectural attractions, but in every respect sufficient for the simple wants of the chief magistrate of the United States, whose official salary is only twenty-five thousand dollars per annum.

During congressional session the President holds weekly *levées*; and one of these I determined to attend, prompted as much by curiosity to see how such things were done as desire to pay my respects. Accordingly, on a certain night, at eight o'clock precisely, I went to the White House, and was admitted without hesitation. On reaching the door of the reception room I gave my card to the district marshal, who conducted me to the President, to whom he introduced me. I was received with a hearty welcome and a shake of the hand. Indeed, I noticed that he had a kindly word of greeting for all who came. Not having any very important communication to make that would be either startling or interesting to the President of the United States, I bowed, and retired to the promenade room, where I found numbers of people who had been "presented" walking about and chatting in groups on all sorts of subjects—political, foreign, and domestic, and anything they liked. Some were in evening dress, others not; but all seemed perfectly easy and affable one with another. There was no restraint, and the only passports required to these *levées* was the very smallest amount of decent behaviour and respectability. There was music also. A band was playing in the vestibule, and everyone evidently enjoyed the *réunion*, and felt perfectly at home. Never having been presented at court, I am not able to make any comparison *pro* or *con*.

There is also an observatory at Washington, which I visited; but not being fortunate enough to meet the—what shall I say? "astronomer royal" comes readiest, but that is not correct: well, then, the—"astronomer republic," I did not see the large telescope and other astronomical instruments worked.

The photographic galleries were all situated on Pennsylvania Avenue, and they were numerous enough. At that time they rejoiced in the name of "Daguerrean Galleries;" and the proprietor, or operator, was called a "Daguerrean." Their reception rooms were designated "saloons," which were invariably well furnished—some of them superbly—and filled with specimens. Their "studios" and workshops behind the scenes were fitted with all sorts of ingenious contrivances for "buffing" and "coating" and expediting the work. Although the greatest number of mechanical appliances were employed in the Daguerreotype branch of photography, art was not altogether ignored in its practice. One house made a business feature of very beautifully-coloured Daguerreotypes, tinted with dry colours, quite equal to those done in Europe. Another house made a feature of "Daguerreotypes painted in oil;" and the likeness was most admirably preserved. We saw one of the President, and several of the members of Congress, which we knew to be unmistakable portraits. Although the Daguerreotype was most tenaciously adhered to as the best means of producing photographic portraits, the collodion process—or the "crystaltype," as they then called it—was not neglected. It was used by a few for portraits, but chiefly for views.

Having seen all that was worth seeing in the city, I made excursions into the country, in search of subjects for the camera or pencil.

Georgetown, a little way from Washington, and its picturesque cemetery, offer several pretty bits for the camera. Arlington Heights, the Long Bridge, and many nooks about there, are sufficiently tempting; but of all the excursions about Washington, Mount Vernon—a few miles down the Potomac, on the Virginia side—is by far the most interesting. Mount Vernon is the name of the place where General George Washington lived and died, and is the "Mecca" of the Americans. Nearly every day there are pilgrims from some or all parts of the states to the tomb of Washington, which is in the grounds of Mount Vernon. They visit this place with a kind of religious awe and veneration, and come from far and wide to say they have seen it. For, in truth, there is little to see but the strangest-looking and ugliest brick building I ever beheld, with open iron gates that allow you to look into the darkness of the interior, and see nothing. I took a view of the tomb, and here it is:—A red brick building, squat and low, of the most unsightly design and proportions imaginable—resembling one of our country "dead-houses" more than anything else I could compare it to. It was stuck away from the house among trees and brushwood, and in an advanced state of delapidation—a disgrace to the nation that had sprung from that great man's honest devotion! Over the Gothic entrance is a white slab, with the following inscription on it:—

"Within this Enclosure
Rest
the remains of
General George Washington."

The remains of "Lady Washington" lie there also; and there are several white obelisks about to the memory of other members of the family.

The house itself is a "frame building" of two storeys, with a piazza running along the front of it, and is on the whole a mean-looking edifice; but was probably grand enough for the simple tastes of the man who dwelt in it, and has hallowed the place with the greatness and goodness of his life. The interior of the house looked as if it had once been a comfortable and cozy habitation. In the hall was put up a desk, with a "visitors' book," wherein they were expected to enter their names; and few failed to pay such a cheap tribute to the memory of the father of their country.

The grounds, which were full of natural beauties, had been allowed to run into a state of wild tangle-wood; and I had some trouble to pick my way over broken paths down to the river-side again, where I took the "boat," and returned to the city, touching at Fort Washington on the way. The day had been remarkably fine; the evening was calm and lovely; the silence of the river disturbed only by the splash of our paddles, and the song of the fishermen on shore as they drew in their laden nets; and the moon shone as only she can shine in those latitudes. Nothing could denote more peace and quietude as I sailed on the Potomac on that lovely evening. There was such a perfect lull of the natural elements—such a happy combination of all that was beautiful and promising—it seemed impossible for such a hurricane of men's passions—such yells of strife and shouts of victory—such a swoop of death as afterwards rushed down those valleys—ever to come to pass.

Such sad reverse was, however, seen on my second visit to the Potomac. The narration of the stirring scenes then presented will form a picture less peaceful and happy, but unfortunately intensely real and painfully true.

(*To be concluded in our next.*)

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CELESTIAL PHOTOGRAPHY.

BY A. BROTHERS, F.R.A.S.*

The credit of having produced the first photograph of a celestial object is generally given to the late Mr. Bond, of Cambridge, U.S.; but it appears from a paper by Professor H. Draper, of New York, published in April, 1864, that in the year 1840 his father, Dr. J. W. Draper, was the first who succeeded in photographing the moon. Dr. Draper states that at the time named (1840), "it was generally supposed the moon's light contained no actinic rays, and was entirely without effect on the sensitive silver compounds used in Daguerreotyping." With a telescope of five inches aperture Dr. Draper obtained pictures on silver plates, and presented them to the Lyceum of Natural History of New York. Daguerre is stated to have made an unsuccessful attempt to photograph the moon, but I have been unable to ascertain when this experiment was made.

Mr. Bond's photographs of the moon were made in 1850. The telescope used by him was the Cambridge (U.S.) Refractor of fifteen inches aperture, which gave an image of the moon at the focus of the object-glass two inches in diameter. Daguerreotypes and pictures on glass mounted for the stereoscope were thus obtained, and some of them were shown at the Great Exhibition of 1851, in London. Mr. Bond also proved the advantage to be derived from photographs of double stars, and found that their distances could be measured on the plate with results agreeing well with those obtained by direct measurement with the micrometer.

Between the years 1850 and 1857 we find the names of Father Secchi in Rome, and MM. Berch and Arnauld in France, and in England Professor Phillips, Mr. Hartnup, Mr. Crookes, Mr. De la Rue, Mr. Fry, and Mr. Huggins. To these may be added the name of Mr. Dancer, of Manchester, who, in February, 1852, made some negatives of the moon with a 4½-inch object glass. They were small, but of such excellence that they would bear examination under the microscope with a three-inch objective, and they are believed to be the first ever taken in this country. Mr. Baxendell and Mr. Williamson, also of Manchester, were engaged about the same time in producing photographs of the moon.

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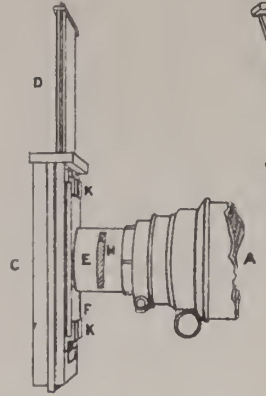
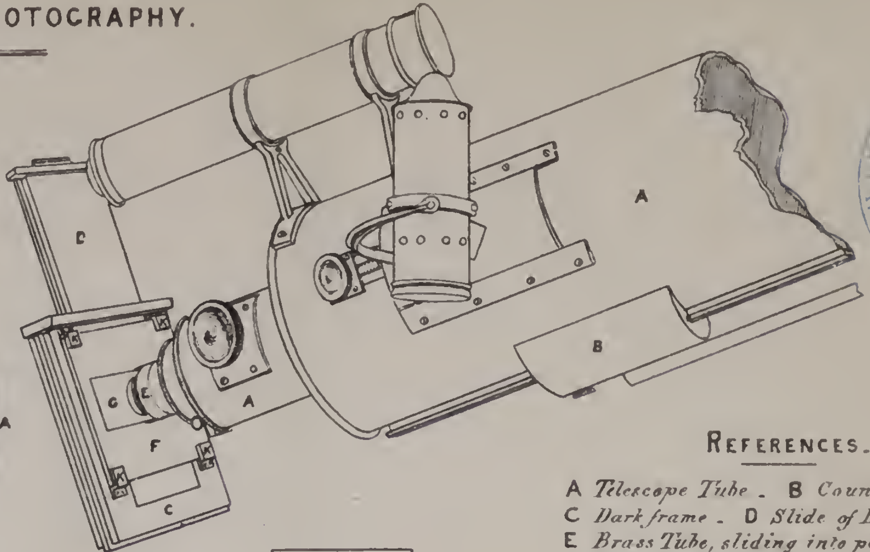
* Read before the Literary and Philosophical Society of Manchester, Photographic Section, December 14, 1865.

CELESTIAL PHOTOGRAPHY.





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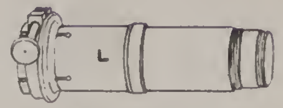
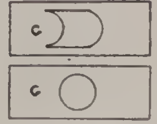
REFERENCES.

A *Telescope Tube.* B *Counterpoise Weight.*
C *Dark frame.* D *Slide of Dark frame.*
E *Brass Tube, sliding into place of Eye piece.*
F *Plate of Metal screwed to* E. G *Diaphragm*
H *Opening in tube for Diaphragm.* K *Clips for fixing* C *to* E. L *Barlow's Lens, sliding into place of Eye-piece.*



BARLOW'S LENS.



DIAPHRAGMS.

Drawn & Photolithographed by
A. BROTHERS, *Manchester.*

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The first detailed account of experiments in celestial photography which I have met with is by Professor Phillips, who read a paper on the subject at the meeting of the British Association at Hull, in 1853. Professor Phillips says:—

> If photography can ever succeed in portraying as much of the moon as the eye can see and discriminate, we shall be able to leave to future times monuments by which the secular changes of the moon's physical aspect may be determined. And if this be impracticable—if the utmost success of the photographer should only produce a picture of the larger features of the moon—this will be a gift of the highest value, since it will be a basis, an accurate and practical foundation of the minuter details, which, with such aid, the artist may confidently sketch.

The pictures of the moon taken by Professor Phillips were made with a 6¼-inch refractor, by Cooke. It is of eleven feet focus, and produces a negative of 1¼ inches diameter in thirty seconds. Professor Phillips does not enter very minutely into the photographic part of the subject, but he gives some very useful details of calculations as to what may be expected to be seen in photographs taken with such a splendid instrument as that of Lord Rosse. It is assumed that an image of the moon may be obtained *direct* of twelve inches diameter, and this when again magnified sufficiently would show "black bands twelve yards across." What may be done remains to be seen, but up to the present time the Professor's anticipations have not been realised.

We have next, from the pen of Mr. Crookes, a paper communicated to the Royal Society of London, in December, 1856, but which was not read before that Society until February in the following year. Mr. Crookes appears to have obtained good results as early as 1855, and, assisted by a grant from the Donation Fund of the Royal Society, he was enabled to give attention to the subject during the greater part of the year following. The details of the process employed are given in the paper with much minuteness. The telescope used was the equatorial refractor at the Liverpool Observatory, of eight inches aperture, and twelve and a half feet focal length, producing an image of the moon 1·35 inch diameter. *The body of a small camera* was fixed in the place of the eyepiece, so that the image of the moon was received in the usual way on the ground glass. The chemical focus of the object glass was found to be eight-tenths of an inch beyond the optical focus, being over-corrected for the actinic rays. Although a good clock movement driven by water power is applied to the telescope, it was found necessary to follow the moon's motions by means of the slow-motion handles attached to the right ascension and declination circles, and this was effected by using an eyepiece with a power of 200 on the finder, keeping the cross-wires steadily on one spot. With this instrument Mr. Hartnup had taken a large number of negatives, but owing to the long exposure required he was not successful; but with more suitable collodion and chemical solutions, and although the temperature of the observatory was below the freezing point, Mr. Crookes obtained dense negatives in about four seconds. Mr. Crookes afterwards enlarged his negatives twenty diameters, and he expresses his opinion that the magnifying should be conducted simultaneously with the photography by having a proper arrangement of lenses, so as to throw an enlarged image of the moon at once on the collodion plate; and he states that the want of light could be no objection, as an exposure of from two to ten *minutes* would not be "too severe a tax upon a steady and skilful hand and eye."

In an appendix to his paper, Mr. Crookes gives some particulars as to the time required to obtain negatives of the moon with different telescopes, from which it appears that the time varied from six minutes to six seconds. The different results named must, I conclude, have been caused not so much by the differences in the instruments as in the various processes employed, and in the manipulation. I must observe, also, that it is not stated whether all the experiments were tried upon the *full* moon, a point materially affecting the time.

Mr. Grubb read a paper on this subject before the Dublin Photographic Society, on May 6th, 1857. After referring to the fact that he found the actinic focus of his object glass to be longer than the visual (thus agreeing with Mr. Crookes) he states it to be generally understood that in a compound object-glass made as nearly achromatic as possible, the actinic focus is shorter than the visual. The most valuable portion of Mr. Grubb's paper is the suggestion for a piece of apparatus to be attached to the part connected with the telescope for holding the dark frame, which he proposes may be so arranged as to follow the moon's motion in declination; and he gives the following description of a contrivance used by Lord Rosse, and which is suitable for telescopes not equatorially mounted:—

> On a flat surface attached to the telescope, and parallel to the plane of the image, is attached a sliding plate, the slide being capable of adjustment to the direction of the moon's path at the time of operating. The slide is actuated by a screw moved by clockwork, and having a governor or regulator of peculiar construction, which acts equally well in all positions. The clockwork being once adjusted requires no change; but the inclination of the slide must be effected by trial for the moon's path at the time of taking the photograph.

This idea originated with Mr. De la Rue; Lord Rosse's share in it arose from his having applied a clock motion to the apparatus.

The telescope used by Mr. Grubb is twelve 1-10th inches aperture and twenty feet focus, giving an image two 1-16th inches diameter in from ten to forty seconds.

The next contribution on this subject is by Mr. Fry, who, in 1857, commenced his experiments on the moon with an equatorial telescope, the property of Mr. Howell, of Brighton. The object glass of this instrument is eight and a half inches diameter and eleven feet focus, and gave an image of the full moon in about three seconds, but under very favourable circumstances a negative was made in a single second. The size of the image is not stated, but it must have been about one and a quarter inches diameter. Mr. Fry appears to have removed the eyepiece of the telescope, and in its place a board was fixed having a screw adjustment, so that a plate-holder could be moved backwards and forwards on the board (graduated to tenths of an inch) for the purpose of finding the actinic focus, which was three-quarters of an inch beyond the visual. He found that that this position of the chemical focus was variable, owing, as he thought, to the varying distance of the moon from the earth, but, as suggested by Mr. De la Rue, it might arise from the length of the telescope tube having altered through change of temperature.

In 1858, Mr. De la Rue read an important paper before the Royal Astronomical Society, from which it appears that the light of the moon is from two to three times brighter than Jupiter, while its actinic power is only as six to five, or six to four. On December 7th, 1857, Jupiter was photographed in five seconds and Saturn in one minute, and on another occasion the moon and Saturn were photographed just after an occultation of the planet in fifteen seconds.

The report of the council of the Royal Astronomical Society for 1858 contains the following remarks:—

> A very curious result, since to some extent confirmed by Professor Secchi, has been pointed out by Mr. De la Rue, namely, that those portions of the moon's surface which are illuminated by a very oblique ray from the sun, possess so little photogenic power that, although to the eye they appear as bright as other portions of the moon illuminated by a more direct ray, the latter will produce the effect called by photographers solarization, before the former (the obliquely-illuminated portions) can produce the faintest image.

And the report also suggests that the moon may have a comparatively dense atmosphere, and that there may be vegetation on those parts called seas.

At the meeting of the British Association at Aberdeen, in 1859, Mr. De la Rue read a very valuable paper on celestial photography. An abstract of this paper was published at the time in the *British Journal of Photography*, and in August and September of the following year further details of Mr. De la Rue's method of working were given in the same journal. The processes and machinery employed are so minutely decribed that it is unnecessary here to say more than that Mr. De la Rue commenced his experiments about the end of 1852, and that he used a reflecting telescope of his own manufacture, of thirteen inches aperture and ten feet focal length, which gives a negative of the moon averaging about one 1-10th of an inch in diameter. The photographs were at first taken at the side of the tube after the image had been twice reflected. This was afterwards altered so as to allow the image to pass direct to the collodion plate, but the advantage gained by this method was not so satisfactory as was expected. In taking pictures at the side of the tube, *a small camera box* was fixed in the place of the eyepiece, and at the back a small compound microscope was attached, so that the edge of a broad wire was always kept in contact with one of the craters on the moon's surface, the image being seen through the collodion film at the same time with the wire in the focus of the microscope. This ingenious contrivance, in the absence of a driving clock, was found to be very effectual, and some very sharp and beautiful negatives were thus obtained. Mr. De la Rue afterwards applied a clockwork motion to the telescope, and his negatives, taken with the same instrument, are as yet the best ever obtained in this country.

The advantage of the reflecting over the refracting telescope is very great, owing to the coincidence of the visual and actinic foci, but it will presently appear that the refractor can be made to equal if not excel the work of the reflector.

Mr. De la Rue's paper (as published in the report of the British Association), contains some extremely interesting particulars as to the mode of obtaining stereoscopic pictures of the moon, and diagrams are given showing the effects of the moon's libration. The most beautiful stereoscopic prints of the moon are those by Mr. De la Rue. Mr. Fry also was very successful in this branch of celestial photography.

In this brief history of the subject of celestial photography, I have not referred to anything which has been done in making photographs of the solar spots, but the matter must not be altogether passed over. The first step in this direction appears to have been taken in France in 1845, by MM. Fizeau and Foucault, but it is chiefly due to the efforts of Mr. De la Rue that so much useful work has been done in heliography. In 1860 Mr. De la Rue and his staff of assistants performed one of the greatest feats yet recorded in this branch of the art of photography, having succeeded in obtaining several beautiful negatives of the various phenomena seen only during total eclipses of the sun, and two negatives were obtained during the totality. One question of much interest to astronomers was determined by this great experiment. The red prominences or flames generally seen as issuing from the edge of the moon were proved to belong to the sun. Photographs of the sun are taken daily when the weather is favourable at the Kew Observatory, and also by Professor Selwyn, at Ely. With the Kew photoheliograph pictures of the sun spots have been made on the scale of the sun's diameter of three feet. Much, however, remains to be done. The light of the sun is so much in excess of what is required to obtain a collodion picture, so that the loss of light consequent on the necessary interposition of lenses and the distance of the plate from the instrument can be no objection; and for these reasons I have very little doubt that with apparatus suitably arrranged photographs of spots and groups of spots will be obtained of very much larger diameter than any yet taken.

(To be continued.)

PARKESINE: ITS APPLICATION TO ARTS AND MANUFACTURES.

BY ALEX. PARKES.

[WE condense the following from a paper read before the Society of Arts, on Wednesday, December 20th.]

PARKESINE is made from pyroxyline and oil, alone, or in combination with other substances; the various degrees of hardness or flexibility are obtained in the easiest and most expeditious manner by varying the proportions of pyroxyline, oil, and other ingredients.

The pyroxyline used as the base in the manufacture can be made from any vegetable fibre or fibre-producing grasses, starch, &c., but preferably of waste from cotton and flax mills, old rags, paper makers' half-stuff, or any fibrous waste material capable of being reduced into a soluble condition by the action of acids.

The oils employed are some of the vegetable and some of the animal kingdom; they may be used alone or combined, either in their normal condition, or changed by a solidifying agent, chloride of sulphur being preferred, which has the remarkable property of completely solidifying the oils almost instantaneously; but the chemical combination can be modified according to the per-centages of the choride of sulphur employed, which will be varied to meet the exigencies of commerce. These solidified oils, although unchanged by ordinary re-agents, are readily soluble in the author's solvents of pyroxyline, by which means the two ingredients are combined to form one of the descriptions of Parkesine.

The inventor, after much research, labour, and investigation, observed that the solid residue left on the evaporation of the solvent of photographic collodion produced a hard, horny, elastic, and waterproof substance. This led him to employ, in all his experiments, pyroxyline, xylodin, or some collateral matter, as his base for future operations. By the word pyroxyline the author wishes to be understood a less explosive preparation than the more highly converted compound "gun cotton," and his constant aim has been to apply to peaceful industrial purposes a material hitherto only used for military, blasting, and photographic purposes. The solutions of collodion known at the time of his first patent, in October, 1855, were practically unsuited to carry out the manufacture in solid masses and other large forms. This necessitated a new series of experiments, to discover a more economical mode of production, and he found that by improving the manufacture of pyroxyline, and using different solvents, considerable success was attained; as an illustration to show the impracticability of using collodion for the manufacture of solid articles, we have here a bottle of ordinary collodion, which is submitted to your notice. This is a solution of pyroxyline in the well-known solvents, ether and alcohol; and when you are told that in one pint of these mixed solvents there is only one-third of an ounce of solid material, and the whole of this pint of solvents must be evaporated to obtain this small quantity of hard substance, you will readily conceive that the cost of production would be much too high for large commercial purposes, as the cost of one pound of the mixed solvents would be 2s. 6d., and the pyroxyline 10s. per lb., and as one pound of pyroxyline will require 48 pounds of solvent to make photographic collodion, it will give a total cost of 130s. per lb. for the solid material which could be obtained from the evaporation of such solvents. The author has succeeded in producing it at a cost of less than 1s. per lb. and upwards, according to the quality required.

Another important improvement in the manufacture of Parkesine is the employment of camphor, which exercises an advantageous influence on the dissolved pyroxyline, and renders it possible to make sheets, &c., with greater facility and more uniform texture, as it controls the contractile properties of the dissolved pyroxyline; camphor is used in varying proportions according to requirement, from 2 per cent. to 20 per cent. Another of the author's improvements for the like object consists in the use of gelatine dissolved in glacial acetic acid.

The author believes he was the first to employ colours in the dissolved pyroxyline. The solvents used in the manufacture of Parkesine are also good solvents of the aniline colours; this gives the great advantage of producing the most beautiful colours in a transparent substance, as well as in opaque or solid masses, as the specimens will show; and when these coloured articles are carved the most exquisite effects are produced, imitating amber, malachite, and many other natural substances; moreover, as the material can be moulded by pressure, the most beautiful works of art can be copied at a very small cost. For many large and cheap applications, as much as 60 per cent. of pigments, saw-dust, or cork-dust can be introduced with advantage, and thus is produced a beautiful and solid substance, very strong, and which can be moulded and turned in a lathe, or rolled into sheets, the cost, owing to these admixtures, being exceedingly low.

There is another important feature in the economy of this material; no loss in manufacture is experienced, every particle, scrap, or dust can be reworked, and the most beautiful effect produced. Specimens will show the effect of some of the waste scraps re-manufactured, and it will be readily seen that by careful admixture of colours very pleasing results may be obtained.

It can be made transparent, or in any colours, variegated to imitate tortoise-shell, marble, malachite, hard or flexible; can be moulded, shaped, by dies or pressure, turned in a lathe, worked into screws, cut with a saw, planed, carved, engraved, rolled or pressed into sheets, as all the articles in the case before you will clearly show; is very agreeable to the touch, and is susceptible of the highest polish; it can be inlaid with metals without any injurious effect upon them after years of exposure; it is also invaluable as a waterproofing agent, and can be used as a varnish for a variety of purposes, and as a non-oxidizing agent for the protection of iron ships, &c.

After some further remarks, a statement of details, illustrating the suitability of Parkesine as an insulating material for telegraphic purposes, concluded the paper. In the discussion which followed, in answer to inquiries, Mr. Parkes stated that the new solvent employed was naptha—either vegetable or mineral—and the material could readily be joined by means of its own solvent.

Photographic Notes and Queries.

SINGULAR CAUSE OF STAINS.

DEAR SIR,—I beg to point out the following as (to me) a singular cause of stains on the negative. While taking a large negative copy some time ago, I was much annoyed by the recurrence of a dense spot always on one part of the plate, which, after a close examination of everything I was using, I found to arise from what appeared to have been a small splash of silver on the inside of the sliding shutter of the dark slide; although scarcely visible, it appeared like frosted silver; its distance from the surface of the plate would not be more than one-tenth of an inch. I found that a plate put into the slide, and allowed to remain two minutes, was sufficient on the application of the developer to bring out the mark, which was always about one inch long, and about half-an-inch broad, of an oval form.—I am, dear sir, yours respectfully,

Glasgow, Dec. 23, 1865 A. WOOD.

PINHOLES IN NEGATIVES.

SIR,—Having some time ago written to you respecting pinholes in the collodion film, I now again beg to trouble you with my recent experience, and I think it may perhaps offer some explanation to the numerous causes of complaint we have under the head of pinholes.

It is a well-known fact that many persons add ammonia to the nitrate bath for the purpose of neutralizing it, and I myself have frequently been in the habit of doing this, partly for convenience, and partly for want of other means when away from home. A short while since, being on a photographic excursion, and finding my bath very acid, I added a small quantity of ammonia, and proceeded to take a picture, when, to my grief, I found the plate so full of the pinholes that it was perfectly useless as a negative. On bringing my bath to the light to look at it, I found that it was full of minute, needle-like crystals, being, I suppose, nitrate of ammonia in suspension. To rectify this, I added half an ounce of nitrate of silver to 1 ounce distilled water, and put it in the bath, this being the only available chemical at hand, which I then filtered twice, and found perfectly free from the crystals and quite clear, and the next picture came out all that could be desired. I may mention that I have repeatedly used ammonia, and never had any similar effects before. The silver, however, of which the bath was made was by no means pure, which may account for it on this occasion, as the bath was nearly new, having been very little used; it had, however, worked satisfactorily previously.

I have no doubt that many persons who suffer from pinholes may attribute it to the use of impure nitrate of silver and ammonia, though I have not seen anywhere that the use of ammonia would cause them.—Believe me, yours faithfully,

Kuwachee, India, Nov. 25, 1865. E. LEGGETT.

[The pinholes doubtless arise from excess of iodide in the bath. As an acid bath holds more iodide of silver in solution than a neutral or alkaline bath, the addition of ammonia wou'd cause the iodide to crystallize out. The addition of fresh silver solution would re-dissolve this, and thus remove the cause of pinholes. We have referred to your other query in "Answers to Correspondents."—ED.]

GLASS HOUSES.

SIR,—In the YEAR-BOOK OF PHOTOGRAPHY for 1866, Mr. O. G. Rejlander, when speaking of glass houses (p. 46), says:—

"It should be remembered that as no more corn will grow on the slope of a hill, however extended, than would grow on the base line of an angle of which such slope is the hypothenuse, so no more light is admitted by the sloping window than would be by an aperture the size of the base of the angle."

Where he alludes to the growth of corn there is no doubt whatever but your contributor is quite correct, for the corn grows perpendicularly, however much the ground may slope, and therefore the quantity of corn is in proportion to the base, and not to the hypothenuse of the triangle. Where, however, he states that "no more light is admitted by the sloping window than would be by an aperture the size of the base of the angle," he falls into an error, inasmuch as light reaches us from all other parts of the sky as well as from the point immediately above us, so that whatever may be the "slope" of the roof, if it be only well open to the sky, an abundance of light will fall at right-angles upon it, the quantity of which will be in proportion to the area of the hypothenuse, and will bear no relation whatever to the base of the angle.

If Mr. Rejlander's statement were correct, an ordinary perpendicular window would admit no light whatever into the room in which it was built; this, however, is certainly not the case.

I make this correction, not in a fault-finding spirit, but because errors, when committed by men of eminence, and allowed to remain uncorrected, are in a fair way for being extensively propagated.

With the highest appreciation of Mr. Rejlander's talents, I am, yours truly, D. WINSTANLEY, Jun.

Jan. 1st, 1866.

[The question depends chiefly upon whether the glass-room have glass sides. If it have, then Mr. Rejlander is strictly correct.—ED.]

Talk in the Studio.

MAGNESIUM LIGHT FOR PRINTING.—Dr. Vogel informs us that he has recently successfully used the magnesium light for printing enamels. Twelve grains of the wire burnt in a lamp, before the Berlin Photographic Society, gave an excellent print by Leth's process of enamelling, recently described in our pages.

ANOTHER WIDE-ANGLE LENS.—Dr. Vogel, in a recent letter, says:—"I have already written to you details of the Steinheil periscopic lens, the new wide angle lens, composed from two crown meniscus glasses. Busch, in Rathenow, had also made a similar new lens, which gives more excellent results than Steinheil's. It is named the *Pantoscopic*. I have taken with the lens a view with an angle of 95 degrees without distortion, and with perfect sharpness up to the margin. But the actinic power is very little. Much more actinic I find the pretty Dallmeyer wide angle lens. I have taken with the lens No. I (focus 7 inches) an excellent landscape 8 by 10, that is, an angle from 71 degrees; and I have also with it an interior seven inches square; the little distortion is not important."

KEEPING PLATES AFTER LEAVING THE NITRATE BATH.—A correspondent signing "Veritas," referring to the keeping of plates for a few hours, says:—"I am only a novice, but I can keep the plate two hours between sensitizing and developing, and then get a good negative for a novice. After sensitizing in the usual manner, wash off the free nitrate, and coat the plate with pure glycerine; this will keep the plate good for a long time. After exposure, wash off the glycerine, and redip the plate before developing. The washing must be done with distilled water, and, if properly done, and pure glycerine be used, he will get a good negative."

DOUBLE ALBUMENIZED PAPER.—We have received from the Albion Albumenizing Company, of Glasgow, some specimen prints produced on paper which has received a double coating of albumen. The first coating of albumen is not salted, and is made insoluble by steam before the second coating, containing the proper proportion of salt, is applied. The object of this double preparation is to secure a very bright and delicate texture, and to keep the image quite on the surface. From the examples forwarded to us by Mr. Roger, of St. Andrews, Mr. Mc Nab, and others, the result seems to be very good indeed, the prints possessing a high degree of delicacy and brilliancy.

GELATINO-CHLORIDE OF SILVER.—We have succeeded in rendering a film of gelatine, holding in suspension chloride of silver, quite insoluble, without the aid of any preliminary coating of albumen or other material, or the addition of anything to the gelatine beyond chloride of silver. More in our next.

City of London Exhibition.—The Corporation of the City of London a few days ago unanimously voted the use of the Guildhall, recently restored at great cost, for the purposes of an Industrial Exhibition, to be inaugurated on the 1st March, 1866. On the motion of Mr. Lampray, F.R.G.S., F.A.S.L., of Paternoster-row, member of the General and Executive Committees, it has been determined to devote the surplus funds towards the establishment of a Free Public Library for the City of London, to which several City firms have already expressed their intention of liberally contributing, and towards which it is believed the Corporation will also lend its aid.

International Photographic Exhibition in Belgium.—M. De Vylder favours us with official information to the effect that an International Photographic Exhibition, under the patronage of the Belgian Government, will be organized in Ghent in August next, which promises, we understand, to be very successful. We shall announce further details in due time.

To Correspondents.

⁂ Our New Volume.—In offering our New Year's greeting to our readers, we have generally spoken of the arrangements made or in progress for interesting and instructing them in the forthcoming volume. We have now simply to say that all the existing arrangements of the Photographic News which have been found acceptable to its readers will be maintained, and some new features, especially of a practical kind, will be introduced. A series of articles especially addressed to professional photographers on subjects pre-eminently interesting to them, which have as yet received but little attention in photographic literature, will be contributed, by Mr. Jabez Hughes, of Ryde, whose very long, extensive, and successful experience in professional photography will, as our readers know, give his utterances especial value. Mr. Nelson K. Cherrill will contribute a series of practical articles on subjects of peculiar interest. The "Photographer's Assistant" will contribute a series of practical articles of the character of a "Photographic Reason Why;" Mr. H. P. Robinson and Mr. Blanchard, besides practical papers, will contribute articles on art. Regular or occasional articles may be anticipated by Mr. J. Spiller, Mr. W. Crookes, F.R.S., Dr. Anthony, Dr. Phipson, Dr. Hill Norris, Mr. Charles Martell, Mr. T. R. Williams, Mr. W. England, Mr. J. E. Cussans, M. Ernest Lacan, Dr. Hermann Vogel, Mr. Charles Waldack, "The Old Photographer," "The Photographer's Assistant," Mr. Samuel Fry, Mr. Cooper, Mr. W. B. Woodbury, Mr. Werge, W. W. King, Lieut. Noverre and many others.

⁂ Celestial Photography.—With the present number of the Photographic News is presented a photolithograph illustrating the apparatus used in celestial photography by Mr. Brothers, whose paper appears in the present number.

W. P. P.—We can only suppose that you used excess of the restraining agent. Did you take care to neutralize the excess of sulphuric acid? 2. It is difficult at times to reconcile the conflicting statements of advertisers. We prefer those of the English maker. 3 and 4. No landscape lens will work so rapidly for portraits as a portrait lens; but the triple is more suitable than the single lens. 5. We have not made any experiments with the method in question, and cannot speak with certainty of its results. Are you certain you obtained the *sulphite* of ammonia?

W. D. B.—The new wide angle landscape lens includes a wider angle than the triple, and works more rapidly; but it is less suitable for architecture than the latter. We should prefer having both, but we are uncertain whether we should give up one for the other, so much depends on circumstances. Thanks for your kind wishes.

December 31st.—Pictures coloured by the aniline colours are, we believe, waterproof. Ordinary water colours are sometimes made waterproof by receiving a coating of some thin varnish or a solution of wax in ether. Mr. Newman, of Soho Square, sells a preparation which, when mixed with water colours, renders them waterproof. Mr. Bing's method appears in our present number.

David Duncan.—The varnish received we will take an early opportunity of trying, and will report.

W. T. N.—We should prefer two sets of sliding blinds. A number of small ones will have the effect of cutting up the light too much; it is better to have your light from one source than from a number of small sources.

A Poor Photographer.—The general plan, &c., of your proposed glass room seems, from your description, to be good. Let your principal light be the east side. You will, however, find it an advantage to have your glass in the middle, and a portion of opaque at each end. You can then have a background at each end, and so take which side of the sitter you choose. We should also prefer a few feet more glass. The blinds for the side lights may slide along a brass rod; but for the roof, they will be better on rollers, so that, rolling them from the bottom to the top, you can have a greater or less portion of the roof adjoining the eaves uncovered or covered, at will. The blinds may be double, one blue and one white.

Geo. Hill.—If you treat plain paper with silver, without previously treating it with some haloid salt, you will of course get weak, imperfect prints. Do you salt the paper first, or is it salted when you procure it? In your description of your operations you do not mention salting at all. You do not describe the faults of your prints. Let us know whether the paper receives any salting preparation, and what; send us also one of the defective prints, and we shall be better able to help you.

Veritas.—We shall be glad to see your prints and give you our opinion. In taking the portrait of Chang, and placing by his side the dwarf or his wife, the object was doubtless to give an impression of still greater relative height. We have mentioned your experience in another column. We shall be glad to answer any of your questions.

E. Leggett.—The spots on the albumenized paper are due, we believe, to a very highly dessicated condition of the albumen, which causes the film to repel the silver solution and causes it to hang on the surface in drops. Where these drops occur the spots follow, as on the specimen we have received. The defect is not an uncommon one; but we have not met with it personally, and give this explanation rather on the faith of others than as the result of our own experience.

A Constant Subscriber.—The immediate cause of the honeycomb cracking of your negatives is damp or frost, and keeping them in a dry place may check the tendency. The remote cause is a trace of the fixing salt left in the film from imperfectly washing after fixation, which leaves hygrometric salts in the film, or the same result may sometimes arise from the washing water containing salts, in which case, after a good washing, the film should be rinsed with distilled water. The best remedy is that suggested by Mr. Nichols in a former volume, and subsequently verified by Mr. Spiller. It consists in submitting the cracked film for a time to the vapour of alcohol, which causes the cracks to re-unite, without showing in the print.

J. W. P.—We cannot, unfortunately, indicate the cause or suggest any other remedy for the spots except changing the sample of paper.

Pallette.—Paper may be excited by gas light or candle light without injury. 2. When the washing water of prints remains clear, and does not become milky, it indicates that there is either very little free nitrate in the prints, or that the water does not contain chlorides. Of the cards enclosed, the reproduction No. 1 is very respectable. Of the others No. 2 is best; if the negative had been a little less intensified the print would have been better.

Studio.—We prefer for a glass house an oblong rectangular building, with the ordinary ridge roof. This we believe to be most easily managed, and useful in any climate. We regard a sloping front light as very difficult to manage. The house standing east and west, with the principal side light north, is the best aspect. 3. It has been suggested as a means of removing hypo from prints to place them, after one or two slight washes, in a pile under very heavy pressure, and then wash them again. It is not necessary to use blotting paper in such a case. Many photographers subject the prints to a similar pressure on removing them from the last washing water to assist in drying them. 4. Mr. Trübner, of Paternoster Row, supplies, we believe, both the *Philadelphia Photographer, Humphrey's Journal*, and the *American Journal of Photography.*

Amateur.—The object of using stops or diaphragms is to secure better definition over a wider field, and to secure "depth of focus." For the mode in which this is effected, and for the rules which should guide you in using stops, we must refer you to a couple of articles in our Seventh Volume, or to an article in our Year-Book for 1865, as the subject is too extensive for full elucidation in this column. As a rule, use the largest aperture with which you can get satisfactory sharpness; the smaller the stop within given limits, the better the definition, but the greater the exposure. The exposure must be four times as long with a stop of half an inch diameter as with a stop of one inch diameter. 2. An iron developer which has been long made is less apt to fog than one which is freshly made, but it is also less active. A freshly made solution not quite so strong, and containing more acid, would act very like another which had been made some time, and was stronger when first made. The change is due to the formation of per-sulphate of iron in the solution, and this not only weakens the developer, but plays the part of an acid. 3. After a plate is properly sensitised, which, as a rule, it will be in from three to five minutes after immersion in the bath, it is generally injured by continuing longer in the bath. 4. Before using the bath for exciting paper, it is always wise to pass a strip of paper over its surface to remove the scum, consisting of organic matter and oxide of silver, which generally forms on its surface after standing awhile. We do not quite understand what you mean by a deposit in "little white lumps;" but anything of the kind arises from the accumulation of some foreign substance which is not soluble. 5. Experience and observation are the best aids in ascertaining when the collodion or silver bath are getting old and imperfect. When the collodion is insensitive, when it begins to give a lumpy uneven film, or when it sets very slowly, these are amongst the indications that it is getting old. When the silver bath is weak, the plates do not readily assume a creamy appearance in exciting, the negatives are weak, and the exposure is long. It is better to add from a stock solution of about forty grains to the ounce. 6. The coarseness of texture in the negative may be due to the collodion giving a rough morocco-like film, or it may be due to short exposure and over much piling on of silver in intensifying.

A Subscriber from the First.—The Copyright Act regards the exhibition of a copy of a copyright picture, or any portion of it, as an infringement. It prohibits copying a picture "for sale, hire, exhibition, or distribution." Nevertheless, we should think, from our knowledge of Mr. G. Cruikshank, that an application to him, explaining the circumstances, would secure you the necessary permission.

R. A.—So far as we can judge from the diagrams and description, the frame is ingenious, and would probably answer. The application of the pneumatic holder to aiding in the formation of a printing frame for opal glass has been made before. We have had a description of one upon our table for some weeks awaiting insertion, having been put aside by press of other matters. We cannot form a sufficiently decided opinion of the invention on paper to advise you. If we saw one in working order we could give a more trustworthy opinion.

E. T. C.—A yellow varnish for the windows of dark rooms may be made as follows:—Mix equal parts raw sienna and orange chrome with japanner's gold size and turpentine, adding a little patent dryers. This, when used of the right consistency, will permit plenty of yellow, but quite non-actinic, light to enter the dark room. The cards you enclose are very excellent.

Registrations and several correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PARIS UNIVERSAL EXHIBITION OF 1867.

Most of our readers are aware that next year a grand Universal Exhibition of the products of science, art, and industry, will be held in Paris, under the direction of an Imperial Commission. As there are now little more than six weeks to elapse before the period of receiving applications for space will have closed, it is important that our readers interested in the matter should lose no time in making their arrangements.

The Exhibition will be held in a temporary building in the Champs de Mars, opening on the 1st of April, 1867, and closing at the end of October in the same year. Applications for space should be made by English exhibitors to the Lords of the Committee of Council on Education, Science and Art Department, South Kensington Museum, who are appointed by the Imperial Commission to carry out the arrangements for this country. The latest period for application is the 28th of February next, but it is not desirable to drive such things to the latest day.

The period for sending in goods is from the 15th of January, 1857, to the 10th of March; everything to be unpacked and arranged before the 28th, the 29th and 30th being reserved for a final general cleaning, and the 31st for a review of the Exhibition preparatory to the opening.

With regard to photography, we should have been glad to announce that it had been classed amongst the fine arts. Such is not, however, the case. The contributions will be divided into ten groups and ninety-five classes. The first group consists of works of art, which are divided into five classes; namely, paintings in oil; painting and drawings, including ceramic and glass paintings; sculpture and die-sinking; architectural designs and models; and engraving and lithography.

Photographs are included in the next group amongst apparatus and the applications of the liberal arts, and is Class IX. It will include "photographs on paper, glass, wood, stuffs, and enamel; heliographic engravings; proofs of photographs on stone; photographic stereotypes; stereoscopic proofs and stereoscopes; enlarged photographs; instruments, apparatus, and chemicals used in photography; materials used in photographic studios." In the same class are included the materials used in painting and drawing, printing and books, stationery, musical instruments, surgical instruments, mathematical instruments, geological apparatus, &c., &c. In short, the classification of photography is strictly with articles of a mechanical character, the majority of the objects in the same group being simply tools. We cannot help regretting this: not that we conceive that any intentional slight is intended to be conveyed. It is probable that the classification of former exhibitions was adopted, in which photography, being regarded as the result of a series of chemical and mechanical processes, and not a creation of the artist's mind was classed amongst the higher forms of mechanical art. The Dublin International Exhibition was the first in which photography was classified amongst the fine arts, and it is a pity to see retrogression in this respect in an exhibition so important as that to be held in Paris next year.

We should be sorry, however, if this circumstance deterred any English photographer, who contemplated exhibiting, from contributing to a great international competition like this. All those who can produce good work should make some effort to maintain the national position in regard to photography, in some branches of which we at present stand pre-eminent. We shall hope to see as liberal a contribution from English photographers at this exhibition as that made by their French brethren, in 1862, to the last Great Exhibition in this country, and that the pictures shall be such examples of photography as will do England honour. We subjoin such extracts from the conditions, &c., for the guidance of contributors, as are most likely to interest our readers.

Art. 11.—In each section assigned to the exhibitors of the same country, the objects will be divided into 10 groups and 95 classes—viz.:

1st Group.—Works of art (Classes 1 to 5).

2nd Group.—Apparatus and applications of the liberal arts (Classes 6 to 13).

3rd Group.—Furniture and other articles intended for dwelling houses (Classes 14 to 26).

4th Group.—Clothing (including fabrics), and other articles worn on the person (Classes 27 to 39).

5th Group.—Products (raw and manufactured) of mining (Classes 40 to 46).

6th Group.—Instruments, and processes of the common arts (Classes 47 to 66).

7th Group.—Food (fresh and preserved) in various states of preparation (Classes 67 to 73).

8th Group.—Live products and examples of agricultural establishments (Classes 74 to 82).

9th Group.—Live products and examples of horticultural establishments (Classes 83 to 88).

10th Group.—Objects exhibited with the special purpose of improving the physical and moral condition of the people (Classes 89 to 95).

The objects which are included in these groups are given in detail in the system of classification (Appendix A) annexed to these Regulations.

In order to avail itself of any suggestions that may be made by the French exhibitors and the Foreign Commissioners, the Imperial Commission reserves to itself the right to resolve, in the successive editions of this document, all doubtful questions to which this first publication may give rise.

Art. 12.—No work of art, or object exhibited in the Exhibition building or in the park may be drawn, copied, or reproduced in any manner whatever, without the authority of the exhibitor who is the author of it. The Imperial Commission reserves to itself the right to authorize the taking of general views of the Exhibition.

Art. 13.—No work of art or object exhibited may be removed before the close of the Exhibition without the special authority of the Imperial Commission.

Art. 14.--Neither French nor foreign exhibitors will have to pay any rent for the space occupied by them in the Exhibition ; but all costs incurred for fittings and decoration in the Exhibition building and in the park must be borne by them.

Art. 15.--Frenchmen and foreigners by the act of becoming exhibitors, thereby bind themselves to adhere to these regulations.

Art. 18.—Works by French and foreign artists, executed since the 1st January, 1855, will be received for exhibition.

Art. 19.—The following will not be received :

1. Copies, including those which reproduce a work in a manner different to that of the original.

2. Oil paintings, miniatures, water-colour paintings, pastels, designs, and cartoons for stained glass and frescoes, without frames.

3. Sculpture in unbaked clay.

Art. 22.—The number and nature of the rewards that may be given in respect of works of art, as well as the constitution of the International Jury who will be called upon to act as judges, will be decided hereafter.

Art. 24.—Detonating, explosive, and other substances of a dangerous nature will not be admitted.

Spirits and alcohols, oils and essences, corrosive substances, and generally substances which may effect injuriously other products exhibited, or incommode the public, will only be received in strong vessels specially adapted for the purpose, and of small dimensions.

Art. 39.—The cost of packing and carriage of the goods sent to the Exhibition, and of the goods which have been exhibited there, is to be borne by the exhibitors, both to and fro.

Art. 41.—The Imperial Commission will not interfere in any way between the contractors for the carriage of packages and the exhibitors in respect of the despatch and the reception of the goods.

The exhibitors must, therefore, either personally or by their agents, see to the transmission and reception of the packages, and verify their contents.

If neither the exhibitor nor his agent be present to receive the packages on their arrival at the Exhibition, the carrier is bound to remove them immediately.

Art. 43.--French and foreign goods will be received into the Exhibition from the 15th January, 1867, up to the 10th March following inclusive.

Art. 44.--The Exhibition is constituted a bonded warehouse.

Foreign goods intended for the Exhibition will be admitted into France, under bond, up to the 5th March, 1867, by the following ports and frontier towns :--

Dunkirk, Lille, Valenciennes, Feignies, Jeumont, Vireux, Givet, Longwy, Thionville, Forbach, Wissembourg, Strasbourg, Saint Louis, Pontarlier, Bellegarde, Saint-Michel, Nice, Marseilles, Cette, Le Perthus, Hendaye, Bayonne, Bordeaux, Nantes, Saint Nazaire, Granville, Havre, Dieppe, Rouen, Boulogne, and Calais.

Art. 47.--All other [meaning except steam, water, &c., for motive power] expenses, such as the employment of workmen in the building, the reception and opening of packages, the removal and charge of packing cases, the construction of counters, stages, glass and other cases, &c., the placing of goods in the Exhibition building and in the park, the decoration of the stalls, and the return of the goods, are to be borne by the exhibitors, French as well as foreign.

The Imperial Commission will point out to exhibitors who may apply, contractors for the execution of their work and for the removal and custody of their cases ; but they are at liberty to employ any contractors or workmen they may think fit.

Art. 49.--The various stalls and fittings may be erected in the Exhibition as fast as the buildings are completed ; they must be commenced at latest on 1st December, 1866, and must be ready for the reception of goods before the 15th January, 1867.

Art. 53.--The name of the producer will be affixed to the goods exhibited. The name of the retailer who usually acts as his agent may be added with the producer's consent.

The Imperial Commission will, when required, make arrangements for the exhibition of goods under the name of the retailer, when they are not sent for exhibition by the producer.

Art. 54.--Exhibitors are requested to insert after their own names or the names of their firms the names of those persons who have contributed in a special manner to the merit of the products exhibited, either as inventors or designers, or by some process of manufacture, or by some remarkable skill in the workmanship.

Art. 55.--The cash price of the objects exhibited and the place where they may be purchased may be stated. This information must be given upon all objects included in Class 91. In all the classes, the prices, if stated, must be adhered to by the exhibitor as respects the buyer, under penalty of exclusion from competition.

Art. 58.—A ticket will be delivered to each exhibitor, which will give him free admission to the Exhibition. This ticket will not be transferable. If it should be proved that the exhibitor has lent or given his ticket to some other person, it will be forfeited without prejudice to further proceedings at law.

To secure the carrying out of this regulation, the ticket of admission must be signed by the holder, who will have to enter the Exhibition by certain prescribed doors only, and he may be required to establish his identity by signing his name in a book to be kept for that purpose.

The number, the nature, and the various grades of the awards, as well as the constitution and functions of the jury, whose duty it will be to apportion them, will be published hereafter.

Further details can be obtained by application to the Committee of the Council of Education, South Kensington.

Critical Notices.

DRY PLATE PHOTOGRAPHY ; or, the Tannin Process made Simple and Practicable for Operators and Amateurs.

By John Towler, M.D., &c.

The chief merit of this work is the excellent remarks and information it contains incidental to dry-plate photography generally. Professor Towler, as our readers know, has a happy knack of making his subject interesting, and communicating valuable instruction on the subjects that arise out of it. He gives here an admirable *résumé* of what is known of the tannin process, and indicates a method of working which, in his conviction, has the merit of extreme simplicity and certainty. Himself an advocate of the wet process, and preferring it wherever it is available, he aims at employing as much as possible the same materials and the same manipulations in the dry process which are used with wet collodion. He sets out, moreover, with the distinct recognition that dry plates, to be certain, must be slow. " The want of success," he observes," in securing a picture on a dry plate has arisen principally from impatience and hurry, and the aim of dry-plate photographers being to shorten the time of exposure, has all along conduced to hurl beginners into the trouble alluded to. Be convinced that the sensitiveness of a dry plate is far inferior to that of a wet plate, five or six times less, that is, if a given lens with a given stop, light, and exposure, will produce a picture on a wet plate in twenty seconds, the same lens will require, under the same conditions on a dry plate, about two minutes at least, and most probably four minutes' exposure would be no injury to the result sought. Do not be beguiled by any assertion of others, or any desire of your own, to diminish the time of exposure ; you will fail assuredly if you do, and will then condemn a good process. The dry plate requires a long exposure ; and learn now that over-exposure is no injury, because there are means of controlling its effects ; but there are *no* means of remedying an under-exposed dry plate, that is, of getting a picture on a film where light has failed itself to perform its part of the wonderful task. It is true that the alkaline developer, as it is called, has a tendency to shorten the long exposure, but it increases in the same ratio the chances of failure."

This much admitted, however, he has much to say in favour of dry plates, especially for still life objects and for transparencies, &c. Here is an example :—

> Transparent positives, opal or porcelain pictures, transparent stereographs, and photo-miniatures, are very easily and beautifully prepared on dry plates, sometimes more easily than on wet plates, and in some instances where it is impossible to take them at all by means of wet plates. To print on glass--that is, on dry plates--has become one of the most enchanting operations in photography, as an evening recreation by gaslight. This light, or the light from a small piece of burning phosphorus, or a few spirals of magnesium wire, is quite intense enough to produce the required actinic effect on a dry plate in a few minutes. During the summer season—the season for trips and excursions—negatives accumulate to a great extent, and remain on hand unprinted until the dreary winter arrives, when nature lies buried in sepulchres, as it were, clothed in white raiment, and when homes become irksome without employment ; now is the time, in the long evenings, with our wife and children around us, to bring the negatives from their niches, take impressions of each by the dazzling jet of light from the

argand burner on the table, and recount to them, in the midst of such vivid illustrations, the stories and histories arising from scenes visited or renowned. This source of innocent and instructive pleasure is inexhaustible; its enchantment cannot be described; it can be understood only by those who have participated in it. A friend of ours, the other day, in all earnestness, asserted that if the dry process did not exist, or some equivalent process, he should forego photography and procure himself a lathe with a slide rest and eccentric chuck, and take to turning cycloidal gyrations in boxwood. Such an expression as this is totally unintelligible to a common operator with the wet-plate process. Let him, however, be able in the evening, with his dear ones around him, to prosecute gaslight photography on *dry plates*; he will be carried away with the ravishing pastime, and with Milton he will exclaim: "Into the heaven of heavens I have presumed, and drawn empyreal air."

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ON ESTIMATING THE ADVANTAGES OF THE NEW ORGANICO-IRON DEVELOPER.

By H. Cooper, Junior.

During the few months the new form of iron developer first suggested by M. Carey Lea has been before the public it has received an unusual share of attention and discussion, and if these be regarded as indicative of the practical trials and careful examination it has received, the final decision of the photographic public as to the value of this new method will be based on tolerably extensive evidence.

On the whole, the general verdict at present seems to be favorable for the new preparation. It is not to be expected that every one should find benefit from a newly introduced formula. I think, however, that when we more fully understand the action of organic bodies in the developer, we shall better be able to appreciate the advantages to be gained by their introduction, and also how to avoid falling into error in their use.

In taking up a new process, difficult as it may be, it is of great importance that the experimentalist be free from prejudice, and unbiassed by the opinions of others. He ought to perform his arduous duties step by step, and dispassionately; for viewing the results of experiments with prejudiced eyes is like looking at objects through a coloured glass—the entire aspect is changed, and the natural relations are destroyed. It has been said "that the habit of pre-judging things, persons, or acts, is so firmly rooted in the human mind, that great efforts are needed to become freed from it." Prejudice has been called blind, deaf, ignorant, and hasty, forming its opinions upon the slightest rumour, or first and superficial appearances. A person under its influence will condemn an object from the most trivial cirtumstances; as the crossing of a whim, the fear of upsetting a favourite idea or theory; or it may be, from personal dislike to those connected with the innovation. The opinion thus prematurely formed is often wrong, sometimes egregiously absurd and enormously unjust, and yet is firmly held for a lengthened period, in spite of the most convincing arguments that can be brought against it.

I am glad to think that, as a body, photographers are very free from the enthraldom of prejudice; yet it very often happens that when a new process is first brought before them, it is either praised up to the skies, or condemned in the strongest manner; and, unfortunately, often upon mere rumour or the most flimsy facts. Yet a division amongst photographers on the introduction of a novelty, to which reference has just been made, is in some respects the best thing that could happen; each party keeps the other in check. Those too enthusiastic are brought down to a sensible level by those who have taken up a neutral position, and who have lent an ear to the opposing or condemning party. Other advantages accrue from opposition. One is, that it makes each party desirous of proving that they are right, either by theory or practice. But it must be remembered that each may be right; as what produces beneficial effects for the one may be as entirely useless for the other. They should carefully examine whether they have each used the new process under the same conditions.

This remark takes us back again to the organic developer, from which for a moment we may have appeared to stray. Since its introduction, numerous articles have been written on the subject; some in favour of the new preparation, and some against it. The great discrepancies in the results obtained have doubtless arisen from the varying conditions under which the new developer has been tried. Some have erroneously supposed that it was expected by the introducers to be suitable for every occasion, and to entirely supersede all the other developers at present in use. This is undoubtedly not the case. All those who have been so enthusiastic in its praise have borne in mind that its advantages exist and are experienced only under certain conditions. When everything is working well, and if the method in use gives entire satisfaction, it is foolishness to wish to alter it. If we are in health we do not require medicine; in fact, taking it would very likely have the effect of making us ill, and thoroughly upsetting us. Just so is it with a process like the addition of gelatine to the developer. If the chemicals are working entirely right, leave them alone. But though some favoured few find the ordinary iron developer all that can be desired, others—and their name is legion—are constantly complaining of being troubled with thin grey images, "which won't intensify," stains of all descriptions, and fog, ditto. Numerous additions have been made to the iron solution in the hope of overcoming these difficulties, with but moderate or only partial success, until gelatine came forward and asked Mr. Carey Lea to give it a trial; saying that it had been very useful in almost every branch of photography, so that there was a chance of its rendering assistance in driving some of the evils from development.

Whether or no it can properly accomplish this, time alone will decide; yet a great number already declare that it can, if properly used. It has been recently urged that attempting to obtain sufficient intensity with the first application of the developer is a step in the wrong direction; in fact, returning to the days of pyrogallic acid. That a developer which gives an intense image in the first instance may be abused, we must all be aware; but in competent hands—I mean those who have had some practice, know what they are about, and use their brains to direct their fingers—a developer of this class is a great advantage. A negative in which the deposit forming the image is very minute in its particles, and whose intensity depends more on a non-actinic colour than on depth of deposit, and which has been obtained before fixing, and by means of a solution that develops detail at the same time that it confers intensity; such a negative, I think, must produce a picture more truthful as regards harmony of gradation than one that was originally of a grey tint, and which required a large amount of forcing before sufficient intensity could be obtained. By using, with discretion, a modification of the new developer, any amount of intensity may be obtained, at the same time avoiding some of the dangers.

As I have gained some very definite advantages from the use of the new developer myself, and gained them without the sacrifice of either time in exposure or delicacy in result, which some seem to fear (having really gained something in both these respects, and lost nothing in any other), I ask for the new power placed in our hands a fair and unprejudiced trial, with a proper attention to the conditions under which its advantages are to be gained. Whether the original formula of Mr. Lea be used, or the efficient and simple variation of it, for which we are indebted to Mr. Cherrill, or the modifications of that gentleman's method which I have suggested; or whether the aceto-gelatine solution (which can hardly be called a modification of Mr. Lea's preparation, although it arises out of it) suggested by "Clericus," but modified and worked by Mr. Hughes, be used, each requires special conditions under which its advantages are best realized. My own preference I have already published. With the preparations I have described, I find that I have gained a power whereby I can obtain intensity where there is a tendency to feebleness;

brilliancy where there is a tendency to fog; and by using a strong iron solution and long development, I can obtain softness and detail with short exposures, which, under other circumstances, would have given me hard black and white pictures.

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PICTURES OF THE POTOMAC IN PEACE AND WAR.

BY J. WERGE.*

My second visit to the Potomac was paid after the lapse of several years, and under very different circumstances. When the Capitol echoed loudly the fierce and deadly sentiments of the men of the North against the men of the South. When both had shouted—

> "Strike up the drums, and let the tongue of war
> Plead for our int'rest."

When the deliberations of the senators were "war estimates," arming of troops, and hurrying them to the "front" with all possible despatch. When the city of Washington presented all the appearance of a place threatened with a siege. When every unoccupied building was turned into a barracks, and every piece of unoccupied land was made a "camp ground." When the inhabitants were in terror and dismay, dreading the approach of an invading host. When hasty earth-works were thrown up in front of the city, and the heights were bristling with cannon. When the woods and peach orchards on the opposite side of the Potomac were red with the glare of the camp fires at night, and the flashing of bayonets was almost blinding in the hot sun at noon. When the vessels sailing on the river were laden with armed men, shot, shell, and "villainous saltpetre." When the incessant roll of drums and rattle of musketry, deadened almost every other sound. When sentinels guarded every road and access to the capital, and passports were required from the military authorities to enable you to move from one place to another. In short, when the whole atmosphere was filled with sounds of martial strife, and everything took the form of desolating war.

In spite of all these untoward events, I found photography actively engaged in the city, in the camp, and on the field, fulfilling a mission of mercy and consolation in the midst of carnage and tumult—fulfilling such a mission of holy work as never before fell to the lot of any art or art-science to perform. For what aspect of life is photography not called upon to witness?—what phase of this world's weal or woe is photography not required to depict? Photography has become a handmaiden to the present generation—a ministering angel to all conditions of life, from the cradle to the grave. An *aide-de-camp* of the loveliest character, to the great "light of the world," humanizing and elevating the minds of all, administering consolation to the sorrowing, increasing the joy of the joyous, lessening the pangs of separation caused by distance or death, strengthening the ties of immediate fellowship, helping the world to know its benefactors, and the world's benefactors to know the world. When grim death stalks into the gilded palaces of the great and powerful, or into the thatched cottages and miserable dwellings of the poor, photography is the assuager of the griefs of the sorrowing survivors, and the ameliorator of their miseries, by preserving to them so faithful a resemblance of the lost one. When the bride, in her youth and loveliness, is attired for the bridal, photography is the recorder of her trustful looks and April smiles, the fashion of her dress, the wreath and jewels that she wore; and, come what change in her appearance that may, the husband can look upon his bride whene'er he likes in after years, as vividly and as distinctly as on that day, connecting the present with the past with a kind of running chord of happy recollections. Photography is now the historian of earth and animated nature, the biographer of man, the registrar of his growth from childhood to "man's estate," the delineator of his physical, moral, and social progress, the book of fashion and the mirror of the times. The uses and applications of photography are almost indescribable; scarcely an art, or a science, or a trade or profession that does not enlist photography into its service. Photography does not merely pander to the gratification of earthly vanity, but is an alleviator of human misery. Photography enters our hospitals and registers faithfully the progress of disease, its growth and change from day to day, until it is cured or ripe for the knife of the surgeon; its pictures are lessons to the professor, and a book of study for the students, charts for their guidance through the painful and tedious cases of others similarly afflicted, teaching them what to do and what to avoid, to relieve the suffering of other patients. Photography is dragged into our criminal law courts, and sits on the right hand of Justice, giving evidence of the most undeniable character, without being under oath, and free from the suspicion of perjury, convicting murderers and felons, and acquitting the innocent without prejudice; and in our courts of equity cases are frequently decided by the truth-telling evidence of photography.

Astronomers, geographers, and electricians freely acknowledge how much they are indebted to photography in making their celestial and terrestrial observations. Engineers, civil and military, employ photography largely in their plans and studies. Art, also, has recourse to photography, and is the only one of the liberal professions that is half ashamed to admit the aid it gains from the camera. If art admits it at all, it is done grudgingly, apologetically, and thanklessly. But there, it is the old, old story of family quarrels and family jealousies. Old art might be likened to an old aunt that has grown withered and wrinkled, and peevish with disappointment, who, in spite of all her long-studied rules and principles of light and shade, harmony of colour, painting, "glazing," and "scumbling," has failed to win the first prize—that prize which a woman's ambition pants after from the moment she enters her teens until her dream is realized—that living model, moulded after God's own image, which not having won in her mature age, she becomes jealous of the growing graces, the fresh and rollicking charms, the unstudied and ingenuous truthfulness of form exhibited by her neice. Old Art the aunt, Photography the niece. Readers, draw the moral for yourselves.

I have digressed, but could not help it. Photography is so young and lovely, so bewitchingly beautiful in all her moods, so fascinating and enslaving—and she has enslaved thousands since she first sprung from the source that gives her life. But to return to my theme.

The practice of photography, like the aspects of the country and condition of the people, was changed. "Old things had passed away, and all things had become new." The shining silver plates, buffing wheels, coating boxes, mercury pans, &c., of the old dispensation had given place to the baths, nitrate of silver solutions, and iron developers of the new. Ambrotypes, or glass positives, and photographs on paper, had taken the place of the now antiquated Daguerreotype. Mammoth photographs were the ambition of all photographers. The first full-length life-sized photograph I ever saw was in Washington, and was the work of Mr. Gardner, the manager of Mr. Brady's Gallery. But a more republican idea of photography, which, strange to say, originated in an empire not remarkable for freedom of thought, soon became the dominant power. Cartes de visite, the many, ruled over mammoth, the few. The price of mammoth photographs was beyond the reach of millions, but the prices of cartes de visite was within the grasp of all; and that, combined with their convenient size and prettiness of form, made them at once popular and created a mania.

The carte de visite form of picture became the "rage" in America about the time the civil war commenced, and as the young soldiers were proud of their new uniforms, and those who had been "in action" were prouder still of their stains and scars, the photographers did a good business among them, both in the city and in the camp. I saw a little of this "camp work" and "camp life" myself, and some of the havoc of war as well. Photographers are adventurous, and frequently getting into odd kinds of "positions" as well as their "sitters."

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* Concluded from page 8

It was my destiny, under the guidance of the Great Source of Light, to witness the results of the first great conflict between the opposing armies of the Federals and Confederates; to hear the thunder of their artillery, and see the clouds of smoke hovering over the battle field, without being in the battle itself. To see the rout and panic of the Northern troops who had so recently marched proudly on to fancied victory; to witness the disgraceful and disastrous stampede of the Northern army from the field of Bull's Run; to listen to the agonized groans of the "severely wounded" as they were hurried past to the temporary hospitals in Washington and Georgetown; to be an eye-witness to the demoralized condition of men who, naturally brave, were under the influence of a panic caused by the vague apprehension of a danger that did not exist; to hear the citizens exclaim, "What shall we do?" and "For God's sake don't tell your people at home what you have seen!" and comparing the reverse of their national arms to a "regular Waterloo defeat," which was anything but a happy simile. To see the panic stricken men themselves, when they discovered their error, and began to realize their shame, weeping like women, at the folly they had committed. But they atoned for all this, afterwards, by deeds of glorious valour which were never surpassed, and which ended in restoring their country to peace and reunion.

The 21st of July, 1861, was a Sunday, and as calm and beautiful a day as could be wished for. From its associations it ought to have been a day of rest and peace to all. But it was not. There was terrible slaughter among men that Sunday in Virginia. During the morning I took advantage of an opportunity offered me to go down to Alexandria in Virginia, about five or six miles below Washington, which was then occupied by a portion of the Federal army. Everything in the place had the appearance of war. There were more soldiers than civilians about. Hotels were turned into barracks and military storehouses. The hotel where Colonel Ellsworth, of the New York Fire Zouaves, was shot by the proprietor for hauling down the Confederate flag—which the latter had hoisted over his house—had been taken possession by the military authorities, and the whole place was under martial law. It was there I first heard rumours of a battle being fought in the neighbourhood of Manassas Junction. These rumours were soon confirmed by the roar of cannon in the distance, and the hurrying of fresh troops from Washington to the field of battle. But they were not needed. Before they could reach the field the "stampede" had commenced, and the retreating hosts came like a rushing tide upon the advancing few, and carried them back, absorbed in the unshapen mass of confusion.

The night came, and little was known by the inhabitants of Washington of the rout and rush of terrified men towards the city; but the next morning revealed the fact.

Wet and wretched was the morning after the battle; the heavens seemed to weep over the disgrace as the men poured into the city, singly and in groups, unofficered and without their firearms, which many had lost or thrown away in their flight. The citizens gathered round them, anxious to learn all about the defeat and the whereabouts of the Confederate army, and invited them into their houses to take refreshment and rest. Several instances of this impromptu hospitality and sympathy I witnessed myself; and many of the weary and wounded soldiers I talked to. They that were only slightly wounded in the hands and arms had their wounds washed and dressed by the wives and daughters of many of the residents. The hotels were crowded, and the "bars" were besieged by the drenched and fatigued soldiers, whom the curious and sympathizing citizens invited to "liquor." The men all told wonderful stories of the fight and of their own escape, but none could tell satisfactorily what had created the panic. Some said that a few "teamsters" took the alarm, and, riding to the rear in hot haste, conveyed the impression that an exterminating pursuit by the Confederates had commenced.

In a day or two the majority of the men were mustered together again, and occupied their old camping grounds, where I visited them, and heard many of their stories, and got some of the relics of the battle field. Fresh troops were raised, and placed under the command of another general. But it was long before another "onward march to Richmond" was attempted. The North had learned something of the strength and prowess of the South, and began to prepare for a longer and fiercer struggle with "Secession."

Such are the two pictures of the Potomac which I have endeavoured to reproduce, and which fell under my observation during my professional perigrinations in connexion with the practice of photography.

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ON AN OPAL OR TRANSPARENCY PRINTING FRAME.

BY F. W. HART.*

In placing my model of a frame for opal glass printing before you, I will, previous to illustrating its action, state the problem that had to be solved in its construction.

1. It is imperative that the negative shall be so held as to preclude the possibility of its falling away, *with the consequent risk of injury.*

2. It is necessary that the negative, when safely held as above, will permit of any size of opal or other plate, smaller or larger, being brought into contact with any part of it. To make this plainer: you are aware that the image on the plate is not always in the centre, for many reasons. Again· 2, 3, 4, and 8 on a plate are in constant use in usual printing; it is desirable that any single one, even of the eight on a plate, should be adjustable to the centre of any small-sized opal plate.

3. That the opal or other plate, oval, square, or any other shape, be readily adjustable, and retained with firmness during the operation of printing.

4. That the apparatus shall ensure parallelism when used with glass of any thickness, and retain it thus to enable inspection to be made during printing.

I will now proceed to demonstrate the practical working of the apparatus before you. In the first place, we will select a plate with four *carte* negatives. It is desired to print from the lower right-hand corner picture. We place the entire plate in the <-shaped groove of the upper frame, which takes any size. It can consequently neither go forward nor backward, and thus the first and most important proposition of the problem is solved—*immunity from breakage.* The surface to print on is now laid under the part of the plate desired, and by means of the three clamps on the diagonal bed it is firmly fixed in its place. The registering frame and screw button are then fixed down. We now relieve the side screws, and the bed comes up and adjusts itself to the negative. The side screws are then tightened again, and the picture put in the light to print. The upper frame can, of course, be lifted as often as desired. By removing the screen at the back, its quality as a transparency can be judged of. In conclusion, as cabinet-making is not a speciality of my business, I shall be happy to afford camera makers or others an opportunity (on application for appointment, by letter addressed to me, at 52, Canterbury Road, London, N.) to fully inspect the apparatus.

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* Read at a Meeting of the North London Photographic Association January 3rd, 1866.

A NEW DEVELOPER—ALBUMEN AND IRON.

BY LEROY GATES.*

Any modification or discovery which will truly improve and facilitate the photographic art is as eagerly sought for as was Carey Lea's new developer. The author has gained an immortal name in the history of photography, that will ever be marked with gratitude by the photographic army—on their way to perfection in this mysterious yet beautiful science. Little was thought of an improvement in the developing agent that would produce such desirable results. Another step is accomplished in the great work of useful art, which an intelligent people will appreciate and enjoy; but yet the work is not finished.

Notwithstanding the fine results of this discovery, so much time, trouble, and cost is required to prepare the developer, that I was induced to experiment, for the purpose of modifying or discovering some new process, by which as fine results could be produced, with little trouble and in a short time. I experimented with several gelatinous substances, with fine results, but not with the designed accomplishment. Finally, I tried the following simple process, and, happily, I succeeded:—

I beat the whites of two eggs to a froth, added eight ounces distilled water, and then added it to forty ounces common iron developer. It is preferable to filter the developer before adding the albumen, but it is immaterial whether the albumen is filtered or not. I will state that the common iron developer should contain eight or nine ounces acetic acid, and three ounces sulphate of iron, but no alcohol.

The gelatine developer I have been using since it was first made public through the *American Journal*, and could never have been persuaded to discard it, had I not found the simple and easy method described a fine substitute.

I kept side by side, in my dark room, the ferro-gelatine and the ferro-albumen developers, and used first from one and then the other, until satisfied that the gelatine had no advantage, in any respect, over the albumen. The following little differences were in favour of the albumen:—

It works slowly, but slightly quicker than the gelatine. It covers the plate smoothly and quickly, with less exertion.

With an old bath, saturated with alcohol and organic matter, it appears to flow and work as easily as if it were new.

When I wish to intensify, I pour upon the plate just enough to cover it—while the first developer yet remains on—of an old bath solution, reduced from three to five grains to the ounce. It produces even and very fine soft results. Instead, a few drops of silver solution may be dropped into a little developer and used. I have adopted the former plan as superior.

The ferro-albumen developer is cheaper and accessible to all, while the gelatine developer is not accessible to many, on the account of not being able to obtain gelatine of sufficient purity in different places; while, at the same time, it takes from two to three days in preparing it for use, when the former can be made at a minute's warning. I coat all of my glass with filtered albumen and distilled water, after having soaked them for a time in acid water, and then washing thoroughly before coating. To get best results, this mode of coating is necessary.

[The editor of the *American Journal of Photography* appends a note to the above to the effect that Mr. Gates, as well as others, seems to have forgotten that the first person to use a viscous developer was Harvey Wendell, of Albany, who used dextrine many years ago. In Mr. Lea's developer the viscous character of the solution is a physical advantage, which chances to be thrown into the bargain; its especial claim in Mr. Lea's view being to certain chemical advantages obtained by the formation of a conjugated salt of iron and gelatine. Nevertheless, we agree with Mr. Seely that the viscous element is a very important one in conferring the advantages which so many have found in the new developer.—Ed.]

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* From the *American Journal of Photography.*

CELESTIAL PHOTOGRAPHY.

BY A. BROTHERS, F.R.A.S.*

The *Quarterly Journal of Science* for April, 1864, contains the next important paper on celestial photography. It is by Dr. Henry Draper, one of the Professors at the New York University. On his return to America, after paying a visit to Parsonstown, where he had the advantage not only of making some observations with Lord Rosse's large reflector, but also of seeing the method there pursued in grinding and polishing mirrors, stimulated by what he had seen, it was determined to build an observatory, and to construct an instrument to be devoted solely to celestial photography. The speculum used by Dr. Draper is fifteen and a half inches in diameter, and twelve and a half feet focal length; but this was afterwards superseded by one of glass on Foucault's principle. The great labour involved in a work of this character may be judged of by the fact that Dr. Draper ground and polished more than 100 mirrors, varying in diameter from nineteen inches to a quarter of an inch; but he appears at last to have secured a good instrument. The chief points to be noticed in this article are, that instead of driving the telescope in the usual way by means of a clock, the frame carrying the glass plate was made to move on the plan previously referred to. Instead of clockwork to effect this motion, an instrument called a "clepsydra" was used. It has a weight on a piston rod, which fits into the cylinder filled with water, which is allowed to escape by means of a stopcock, and can be regulated with great exactness so as to follow the object. The large number of 1,500 negatives are stated to have been taken at this observatory, some of which would bear magnifying twenty-five diameters (the paper says *times*, but I assume this to be an error, as a negative must be very bad if it will not bear more than five diameters, or twenty-five times). As the average size of the negatives was 1 4-10th inch, an increase of twenty-five diameters would give an image of the moon nearly three feet in diameter. I have not seen the prints from those negatives, and have never heard anything of the quality of the work produced by this telescope; but it may be stated that Dr. Draper writes as if the negatives were of the best quality, and encourages others to follow his example.

Nearly a quarter of a century has elapsed since the moon was first photographed in America, and our friends on that side of the Atlantic have not been idle in the interval. To an American gentleman we are indebted for the best pictures of our satellite yet produced, and it is difficult to conceive that anything superior can ever be obtained; and yet with the fact before us that Mr. De la Rue's are better than any others taken in this country, so it may prove that even the marvellous pictures by Mr. Rutherford may be surpassed.

Mr. Rutherford appears, from a paper in the *American Journal of Science* for May of the present year, to have begun his work in lunar photography in 1858 with an equatorial of eleven-and-a-quarter inches aperture, and fourteen feet focal length, and corrected in the usual way for the visual focus only. The actinic focus was found to be seven-tenths of an inch longer than the visual. The instrument gave pictures of the moon, and of the stars down to the fifth magnitude, satisfactorily when compared with what had previously been done, but they did not satisfy Mr. Rutherford, who, after trying to correct for the photographic ray by working with combinations of lenses inserted in the tube between the object glass and sensitive plate, commenced some experiments in 1861 with a silvered mirror of thirteen inches diameter, which was mounted in a frame and strapped to the tube of the refractor. Mr. Rutherford enumerates several objections to the reflector for this kind of work, but admits the advantage of the coincidence of foci. The reflector was abandoned, and a refractor specially constructed of the same size as the first one, and nearly of the same focal length, but corrected only for the chemical ray. This glass was completed in December last, but it was not until March 6th of the present year that a sufficiently clear atmosphere occurred, and on that night the negative was taken from which the prints were made, and through the kindness of Dr. Roscoe I now have the pleasure of showing them to you.

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* Concluded from p. 10.

I have entered somewhat minutely into particulars of what has been done in this branch of our favourite art, in order that we may have before us a kind of summary or index of the work done up to the present time, so that those who desire further information may at once refer to the authorities quoted. It may be asked why it was thought necessary to draw up this paper, as Mr. De la Rue and others have said almost all that is necessary to enable anyone to take up the subject and to pursue it successfully.

It is true there are very elaborate papers, and from their perusal I have derived much useful information; but at the same time it must be confessed that their very elaborateness deterred me, for a long time after I possessed the necessary apparatus, from commencing the experiments which have since afforded me so much enjoyment.

Every writer on this subject speaks of the difficulties encountered from optical, instrumental, and atmospheric causes; and to this may be attributed the fact that we have so few of our amateur astronomers giving their attention to the subject. Another reason may be that comparatively few of those who possess telescopes may have the necessary photographic knowledge; but surely some friend having this knowledge might be found who would be willing to spare a few hours occasionally to assist in taking negatives of the stars, planets, or of the moon. The reason, then, why this subject is brought before your notice this evening is, that it is believed that the apparatus I use is, in some particulars, more simple than any heretofore described; and as it can be used with any kind of telescope, a greater number of amateurs than are now engaged in it may be induced to follow this fascinating branch of photography.

It will have been noticed that when particulars of the apparatus have been given the writer has spoken of a *small camera*, which has been fixed at the eyepiece end of the telescope. As to how this was effected I have seen no description, and as no camera box is required I need not enter into any supposition as to the mode in which it may be done. Before deciding what was necessary to be done, it occurred to me that the telescope tube itself is the camera, and all that was required was the means of fixing the dark frame or plate holder. If the telescope be pointed to the moon, the eyepiece removed, and a piece of ground glass held between the eye and the aperture, the image will be seen on the glass, and we require then the means of holding the sensitive plate steadily near the same place. All that is needed is a brass tube about four or five inches long, of the size exactly fitting the tube of the telescope in the place of the eyepiece. In some cases the sliding tube of the eyepiece may be unscrewed and used for this purpose. At one end of this tube a thread is cut and is made to screw into a piece of metal plate (in the centre of which is a circular aperture of the same size as the tube), of the same dimensions as the dark frame. Attached to the plate-holder are clips accurately fitting the brass plate, but so that the frame will easily slide off and on without disturbing the telescope. This is all the additional apparatus required to enable photographs of the moon or any other celestial object to be made. A separate frame for the ground glass is not necessary; it must be cut to fit the dark frame, and while in use can be held by slight springs fixed inside the frame at the sides.

The accompanying photo-lithographed copy of a drawing shows the arrangement of the apparatus when in its place for taking a negative, and renders further description unnecessary. The method for ascertaining the actinic focus may be stated in a few words. With the rack motion adjust the focus for distinct vision on the ground glass, and then mark the tube E, and also the sliding part of the telescope. Although very unlikely to be of the slightest use, unless taken with a reflecting telescope, a picture may now be taken; it will at least serve to give some idea of the proper exposure. If the chemical and visual foci are not coincident the image will have a blurred appearance. Before exposing the next plate, turn the adjusting screw so as to lengthen the tube about the sixteenth of an inch, and so proceed until, by the greater distinctness of the image, it is seen that the chemical focus is found. At every change of the focus a slight mark should be made on the tube, and when the true focus is satisfactorily determined the marks should be made distinctly visible; and in all future experiments with the same instrument the focus will be always at or very near the same place. Should it be found that the indistinctness increases, it will of course be necessary to try in the other direction.

The appearances arising from atmospheric disturbances are very much the same as when the object is out of focus; experience alone will enable the operator to determine from which cause the defect proceeds.

It is assumed that the telescope is provided with a driving clock; when such is the case every care should be taken that all the parts are clean, and when necessary oiled or greased, so that the motions may be as smooth as possible.

In photographs of the moon in the phases prior to and after the full, the side opposite to the sun is always too light, or "burnt up," while those parts near the terminator are often so dark that only the tops of the craters and peaks are visible, although in the telescope a clear and bright image can be seen. The cause of this must be that the exposure, if continued long enough to bring out all the eye can see on the darker side, would entirely obliterate the details on the brightly-illuminated portions of the moon's surface. Mr. De la Rue's suggestion as to why the dark side of the moon has so little actinic effect, has been already referred to. I would suggest that, as the light of the full moon is 100,000 times weaker than that of the sun, the *twilight* on the moon's surface must be very much less, and consequently the actinic effect of the light is lessened in the same way as at a corresponding time on the earth.*

The question, then, of photographing the terminator is only one of time, and in order to remedy the defect spoken of to some extent I have used diaphragms such as are shown in the drawing. In the tube E openings are made on opposite sides, and wide enough to admit the diaphragms to be used without touching the tube. The diaphragm must be of the proper length and width to shut off the moon's light until the plate is ready for exposure. The shape of the diaphragm will suggest which form should be used according to the moon's age. The exposure should be made with the full aperture for as many seconds as previous experiments have proved to be necessary for the bright side, and the diaphragm then gently moved and kept in motion, gradually approaching the darkened side. By this means the exposure may be regulated, and the great differences in the light and dark sides of the moon may be modified.

As to the processes employed, each experimenter must adopt the one he finds in his hands gives the best result. It seldom happens that two operators can produce the same effects with, *apparently*, the same chemicals. Experience has shown me that the ordinary patent plate glass (carefully selected, so as to be free from scratches and other defects), is preferable to the white patent plate, having found that after a time the surface becomes covered with a kind of dew or "sweat," as it is termed, owing to the decomposition of some of the salts used in the manufacture. The collodion used was made for me by Messrs. Huggon and Co., of Leeds; it is very quick, free from structure, and suitable for iron development. I prefer to develop with an iron solution, using only sufficient to cover the plate; and with this developer and collodion, when the plate has been properly exposed, a negative can be obtained which will not require intensifying afterwards. Not having had sufficient experience with pyrogallic acid, I cannot speak with confidence as to any advantage it may possess in giving fine texture to the negative. With the bath and collodion exactly in the proper state, there is no doubt that with this acid negatives may be made as quickly as with iron; but it is extremely difficult to have everything constantly in the best working order. Unless the greatest attention be given to this matter, the time of exposure is so much increased that iron, for this reason, must have the preference.

Upon the character of the image after development entirely depends the value of the enlargement to be made from it, and in this direction there is much room for improvement. Even in the best negatives yet made defects from this cause are very apparent. The microscopic photographs by Mr. Dancer have the finest texture, and will consequently bear greater magnifying than any other photographs I have ever seen; but the process by which they are made is not published.

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* In the absence of an atmosphere on the moon there can be no *twilight* such as we have on the earth. The meaning, therefore, of this sentence may be misunderstood. It was intended to say that on those parts of the moon enlightened only by the oblique rays of the sun, the light is so diminished that the actinic effect is lessened, as it is on the earth shortly before sunset and during twilight, when it is well known that a much longer time is required to obtain a photograph.

The weather in this country is so very uncertain, and success in this branch of photography is so entirely dependent on the state of the atmosphere, that it is necessary to be always prepared to take advantage of a favourable night. I have a small cupboard placed in a convenient part of my house where there is a supply of water, and the temperature is always much above the air outside. This cupboard is just large enough to hold a small glass bath fixed at the proper angle ready for use, also the bottles for collodion, bath, developing and fixing solutions, and other little requisites. This arrangement is so convenient that when there is a prospect of getting a negative I can set the telescope, prepare the plate, and take a negative in less than ten minutes. But when there is a chance of two or three hours' work, an assistant is desirable, as the best results can only be obtained when one's attention is chiefly devoted to the careful adjustment of the apparatus connected with the telescope.

The convenience of the plan adopted may be judged of by the fact that on the evening of the partial eclipse of the moon, the 4th October last, in four hours I succeeded with the help of two assistants in taking no less than twenty negatives, and the telescope was several times disturbed to oblige friends who desired to see the progress of the eclipse through the instrument, but the apparatus was quickly readjusted, although, possibly, in some cases, with slight loss of definition in the negative through haste. At a previous meeting, I described how those negatives were made, but it may be interesting to refer to the fact that while the fifteenth of the series was being taken the telescope was at rest. The clock had been disconnected for readjustment, and it was forgotten when the plate was ready for exposure, consequently the moon had moved partly off the plate, and the negative shows a portion only; but the exposure was so short that the eye fails to detect any difference between the sharpness of this and the others, which were all taken when the clock had been watched and carefully regulated for the moon's motion. This fact is, I think, of some interest, as it shows that about the time of full moon, when the light is of the greatest intensity, pictures may be made with telescopes not equatorially mounted.

My telescope is a refractor of five inches aperture and six feet focal length, giving an image of the moon averaging about eleven-sixteenths of an inch in diameter.* The object glass is of Munich manufacture, and is mounted by Mr. Dancer on the Sisson's or English plan with double polar axis. The hour circle is twenty-six inches in diameter, and is used also as the driving wheel, having teeth cut in the edge in which a screw works, and by which it is connected with the driving clock by a rod, and can be instantly disconnected by means of a cam. The object glass is an excellent one, and the mounting is everything that can be desired.

The negative taken direct in the telescope is but one step towards what we require, that is, the enlarged copy on paper. From the small negative a positive on glass must be made, say of twice or three times the diameter of the original. It will be quite unnecessary here to explain how the enlargement is to be made, but I may remark that the negative should be placed with the film side towards the copying lens, and the resulting positive copy must also be placed in the same way. The enlarged copy or negative will then give the true telescopic appearance of the moon. In the print of the full moon by Mr. Rutherford a mistake has been made, arising from the negative or positive copy having been placed the wrong way, and consequently the moon looks as if it had been photographed from the opposite side. The print is a very beautiful one in other particulars, but entirely worthless as a picture of the moon, as the eye can never see it as there represented.

I have sometimes taken two negatives on the same plate. It will be seen in the drawing that the dark slide is not quite central with the telescope, so that by reversing the plate after one exposure a second picture can be taken. In photographing the planets, Mr. De la Rue has allowed the object to move on for a few seconds, the telescope meanwhile being at rest, and thus four or five negatives can be taken in a very short time on the same plate. It has occurred to me that by having a frame made "landscape way" instead of upright, and in place of having four clips such as K, there might be a kind of groove at top and bottom, so that after taking the first negative, and the light shut off, by moving the plate about an inch, at least three negatives might be taken on the same plate—or a "shifting back" might be adapted. The advantages of this plan are that different exposures might be tried, and the development continued for the one or two which promised the best results. This method would effect a great saving of time, which on a fine night is of much importance.

With the Barlow lens I have made some negatives which have shown that when the same care has been taken to find the actinic focus, negatives of a much larger size may be made, and in a very short time. The image is increased from eleven-sixteenths to one and a quarter inch, and the time of exposure at full moon was two seconds. The fittings of the lens are so arranged that three different-sized negatives may be taken.

There are several other matters which it might have been desirable to refer to had time permitted, but they must stand over to a future occasion.

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Recent Patents.

DOUBLE BACKGROUNDS AND INSTANTANEOUS COLOURING.

BY LEANDRO CROZAT.

Some time ago a large number of specimens reached photographers in this country, bearing the Madrid post-mark. They were accompanied by a circular, in curious English, offering instructions and licence for producing pictures like the specimen for a certain consideration. The specimens were vignettes, graduated into a grey ground, and were tinted by a method styled "instantaneous colouring." A provisional specification was lodged at the Patent Office, but the patent was never completed. The double background was effected by the system of masking, which Mr. Harmer and Mr. Cooper have described in our pages. The method of colouring is described as follows:—

The instantaneous colouring is obtained in the following manner:—Dip a brush of the size of a pen into the liquid called the instantaneous colouring, the component parts of which are given hereafter, and pass it successively on the lips of the portrait; then take the first and pass the brush on the most shaded cheek by rubbing and enlarging the circle which is to be coloured; then pass it in the same way on the extremity of the chin, and then on the cheek that is less shaded; lastly, on the whole face. All these operations must be performed quickly in five or six seconds, or else the picture takes too much colour and does not succeed. Then put the portrait into a basin of water, and pass over it two or three times a very soft brush to remove the gum and the superfluous colour; this done, place it twice in succession between folds of blotting paper, pressing your hands over it in order to dry it. The operation of colouring the first of the three portraits being over, take a fourth portrait and touch its lips with the brush, and leave it to return to the second portrait of the first three: as the legs have already been coloured, pass the brush on the cheeks, on the chin, and on the whole face, washing and drying it as explained for the first portrait. Take a fifth portrait; touch the lips with the brush; leave it, and return to the third of the first three, and repeat the same operation as on the first and second. By acting thus you will always have three portraits with their lips coloured and ready for the complete colouring of the face.

However, either from want of practice or some other reason, some may prefer a weaker colouring in order to be able to paint with greater ease but less rapidly; in this case they have only to double or triple the quantity of water without altering the proportions of the components.

When coloured, the portraits will still require greater brilliancy. For this purpose I take a glass rather larger than the portrait, and pour over it, as if to collodionize it, the solution No. 1 of the preservative varnish herinafter given, and one minute after put the glass thus prepared into a porcelain pan containing the solution No. 2, and with a hook raise it a little from time to time until it is slightly covered with the liquid, which will be seen by the cessation of the veins or tears noticeable on the coating of the first solution; then take out the glass and leave it on the table; take the portrait and place it on the blotting paper and the picture downwards; pass on the back of this portrait a soft brush imbibed with water in order to soak it well; shortly after stretch it on the prepared glass by slightly passing your fingers over it to make it adhere evenly, and allow it to dry, which will take more or less time according to the atmosphere of the place. In damp weather I varnish in the operating room at night, and the portraits are detached in the morning; in summer I detach them half an hour after varnishing, and sometimes sooner. In order to detach the portrait from the glass, pass the blade of a penknife or a similar instrument up and down on each side, then, taking the portrait and lifting it by one corner, it may be completely separated from the crystal; but if the portrait should not come off properly, it is a proof that the glass was not clean, in which case it will be sufficient to breathe on it for a few moments, or to expose it to the influence of steam. Once detached, the portrait should be cut out and stuck on the cardboard with a thick solution of gum arabic.

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* The actinic focus is one-tenth of an inch longer than the visual.

In order to render a glass fit to receive the varnish it should be cleaned as follows:—Place it in a solution of nitric acid in the proportion of one part of acid to two of water. At the end of twenty or thirty minutes wash it with water, wipe it with a piece of linen, and place it on the tablet called plate cleaner or polisher, and rub it with a piece of bombazine containing some powdered Briançhon chalk (glove or boot powder), and then pass over it a soft-haired brush. As in winter it will happen that the solution No. 2, or gelatine, may become chilled or coagulated, to keep it lukewarm I use a tin box on which I place the basin containing the gelatine, and inside the box is a small spirit of wine lamp with but very little flame. By using two or three basins at a time two men can easily varnish two-hundred portraits in one hour; by using glasses large enough to hold four or more portraits they could varnish a much larger number. Images other than portraits may be produced in like manner.

Instantaneous Colouring.

1. Distilled water	about 62 cubic inches
2. Alum (not calcined) ...	20 grains
3. Cream of tartar	30 ,,
4. Cochineal (fine, in powder)	10 ,,
5. Saffron	2 ,,
6. Magenta	100 drops.

Observations.—When the first three ingredients in an open bottle are dissolved by means of a water bath, the fourth is added, and the fifth a few moments after. When it is at boiling point it must be taken out and the sixth ingredient added. When cold it should be filtered, and then it will be fit for use. To dissolve the magenta when in a solid state, put two grains of it into a bottle containing three cubic inches of alcohol at 40 degrees, shaking it for a moment and adding one hundred drops of this solution to the preceding recipe, more or less, according to the activity you wish to give to the bath. If the colouring thus composed is too red to colour yellowish or old faces, add saffron with discretion. When, in time, this bath loses some of its strength, it may be restored by adding a few drops of the last ingredient.

Preservative Varnish: First Solution.

Sulphuric ether at 60 degrees ...	34 cubic inches
Alcohol at 40 degrees	28 ,, ,,
Photographic cotton	from 30 to 35 gr.

according to its greater or less facility of dissolving.

Observations.—The ingredients above mentioned are put into a bottle in the prescribed order, and are to be agitated until in perfect solution. This solution should only be used after 24 hours' settling; it is still better if it is let stand longer.

Second Solution.

Soft water	62 cubic inches
Gelatine (fish glue)	from 50 to 60 gr.

Observation.—Dissolve it in a porcelain pan on a slow fire or over a lamp.

OPAL GLASS FOR PHOTOGRAPHS.

BY W. G. HELSBY.

This invention received provisional protection only. Its object is improvements in opal glass for photographs. It is as follows:—

The practice recently introduced by me of polishing the surface of opal or other enamel on sheets of transparent and colourless glass provides surfaces well adapted for photographic pictures and impressions, especially those seen by reflected light, and known as positives. There is, however, a want of "depth" or "body" in the "ground" of pictures or impressions taken on the said polished enamelled sheets, and to remedy this defect, or supply the desired "depth" and "body," and to provide a smooth surface, are the objects of my improvements. The opal or other coloured enamel and the glass are united together in the process of manufacture in the usual way, but instead of the glass to or with which the enamel is secured or made being transparent and colourless, I make it with a "body colour" of any desired tint or quality by placing the proper materials in the "glass pot;" rose and cream will be the most desirable colours when the enamel is opal, but the colours may be varied. When the enamelled surfaces are polished, the sheets are ready for use.

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Proceedings of Societies.

North London Photographic Association.

The usual Monthly Meeting of the Association was held in Myddelton Hall on the evening of Wednesday, Jan. 3rd, Mr. W. W. King in the chair. The minutes of a preceding meeting having been read and confirmed, Mr. W. J. Collings was elected a member of the Society.

The Chairman called the attention of members to the presentation prints now ready for distribution amongst members, consisting of two cabinet pictures of English Lake Scenery by Mr. Mudd, one of Alpine Scenery by Mr. England, and a fourth (12 by 10) of Christ Church Priory, Hants, taken by Mr. F. Good, with Dallmeyer's new wide angle single lens. Those who received the Journal were only entitled to the two latter prints.

Mr. Hart then read a paper describing a printing frame designed for opal glass printing (see p. 17). He also exhibited the frame and the mode of working it, which met with general approval.

After some conversation on the subject,

Mr. Swan, of Newcastle, exhibited a rost and ingenious instantaneous shutter, possessing some novel features. It is intended to be attached to the lens so that the shutter shall cut off the light (in a portrait lens) at the point midway between the lenses where the rays cross. The rapidity of descent of the shutter, which falls like a guillotine, is regulated by the distance which a ball attached to a cord is permitted to fall. The shutter thus possessed something of a chromo-metrical character. Taking advantage of the law of uniformity of rate in falling bodies, it was arranged that for short exposure the ball should only fall a short distance, and complete the opening and closing of the aperture; whilst if the distance for the ball to fall were increased, the amount of the exposure would be increased in like ratio. The shutter was released by touching a trigger, and produced no vibration.

After some conversation and some votes of thanks,

The Chairman announced that at the next meeting Mr. F. Haes would read a paper on his experience in photographing the animals in the Zoological Gardens, in continuation of a former paper at the Parent Society. The proceedings then terminated.

London Photographic Society.

The usual Monthly Meeting of the Society was held in King's College, on the evening of Tuesday, January 9th, Mr. J. Glaisher, F.R.S., in the chair. In the absence of the Secretary, Dr. H. G. Wright read the minutes of the last Monthly Meeting, which were confirmed. He then read the minutes of the Special Meeting, which—after some observations by Mr. Hughes, and an attempt to make a statement by Mr. Johnson, which was disallowed as out of order—were also confirmed.

Mr. E. Dunmore was then elected a member of the Society.

Mr. Heisch and Mr. H. Claudet were elected to fulfil the office of auditors at the general meeting in February.

Mr. Hughes then read a paper on the "Organic Iron Developer," for the purpose of opening the adjourned discussion on the subject. The chief purport of his remarks, after pointing out the distinct advantages of a chemical and of a physical character to be gained, and indicating that the former was best gained by Mr. Cherrill's formula, and the latter by the simple addition to the ordinary developing solution of a little gelatine—about two-thirds of a grain to the ounce—was to point out that gelatine conferred two new powers on those who required them. Those who failed to get intensity had here the means; those who found it difficult to cover large plates without stains had, in the viscous solution, a facility not possessed before. Those who succeded well without such aids would, of course, dispense with them.

Mr. H. Cooper, Junr., read a paper on the same subject, and following out similar ideas. He also exhibited some charming specimens, the majority of which were produced by a simple application of the new iron developer without any intensifying whatever.

Mr. Nelson K. Cherrill then read a paper on the same subject, which was chiefly addressed to the chemical questions involved, in which he pointed out the analogy subsisting between the substances produced in the preparation of the new developer and acetic acid. He exhibited a photograph of fine clouds developed with the new solution.

The three papers will appear in our next.

Mr. Allen had not succeeded very satisfactorily. The facility in flowing was a small matter; but he should like to secure the intensity spoken of at one operation, as he believed that intensifying always injured a picture. He thought that it was an error to suppose the gelatine acted chemically at all; he believed its action to be purely mechanical.

Mr. S. Fry believed that the employment of gelatine in the developer was the greatest boon to photographers since the introduction of the method of using bromo-iodized collodion in place of the old plan. He took it up with a strong prejudice against it. He had tried Mr. Carey Lea's formula, and failed to derive any advantage. He then tried Mr. Hughes's formula with the most complete success. He could not imagine how any one could fail to derive from it the most enormous advantage, especially during the dull winter months. During eight months of the year he succeeded perfectly with the ordinary iron developer, getting, as a rule, sufficient intensity with one application; but during the four dull months, poor, thin negatives were produced with the same treatment; and it was then that the enormous advantage of Mr. Hughes's formula was found. He had compared the negatives obtained last winter with those secured with the new developer, and the latter looked like summer pictures compared with the others, and had the fine bloom which was so pleasant to see. He had tried the new developer on the most trying subjects, such as enlargements on 20-inch plates, and secured perfect intensity without any after process.

Mr. Debenham said that the gelatinous solution flowed more readily, certainly; but he found the necessary exposure was longer, in the ratio of 5 to 3. Moreover, he found a greater tendency to spots from any dust in the atmosphere. In his opinion no negative was perfect which had not received its final intensity by means of a little pyro and silver.

Mr. Buchanan Smith said, if he rightly understood Mr. Cooper, the specimens he had exhibited, which were perfect gems, were from negatives not intensified.

Mr. Debenham thought that they wanted brilliancy.

This opinion was not concurred in by the majority of the members, many of whom regarded them as perfect.

Mr. Fry had most carefully tested the subject of exposure, exposing a plate coated with the same collodion, excited in the same bath, and exposed simultaneously with twin lenses, then developing one half with the old and the other half with the new developer. He found no increase in the exposure whatever necessary.

Mr. Debenham had adopted the same plan in his experiments.

Mr. Cherrill said that whenever the exposure was longer, it was clear that too large a proportion of the restraining agency was employed. With one of the preparations with which he had experimented—formiate of glycocine—he believed that the exposure would be reduced to one half the usual exposure. He had not yet tried it sufficiently to speak absolutely; but he would do so, and communicate the results through the Photographic News.

Mr. Debenham said he might mention that he had used two-thirds of a grain of gelatine in one ounce of the iron developer, containing double the usual proportion of iron, and half the usual proportion of acetic acid.

Mr. Cooper asked what kind of negatives Mr. Debenham usually obtained.

Mr. Debenham said his negatives were not thin, but they generally just required a little intensifying to produce the proper effect.

Mr. Cooper said that he found in many cases that those who had succeeded well with the old developer did not like the new one; whilst those who before got thin grey images found the new solution a great boon. He agreed that it was not always desirable to get full intensity at one operation; but the aim here was to secure negatives which require very little instead of much intensifying.

Mr. Allen said if things were in proper order, and the exposure right, he could get an average of six out of every ten negatives which did not require intensifying, and these he thought were the best class of negatives.

Mr. Johnson was more mystified at the close of the discussion than he was at the commencement. He complained that no definite data—such as the kind of collodion, the condition of the bath, &c.—had been given. The whole question was altogether relative, but no data for comparing relations had been given. In recommending the addition of unaltered gelatine to the solution, Mr. Hughes seemed to have forgotten that it was not soluble, but would become gelatinous at a low temperature. There were various methods—such as boiling with a little acid—which would keep the solution fluid. He thought Mr. Cherrill's paper was too purely theoretical for such a meeting (cries of "No, No").

A conversation as to the collodions used by different experimentalists followed; but it was agreed that it would be improper in a society meeting to mention names.

Mr. Cherrill said that if names were mentioned the meeting would not be much wiser, as the makers would not be likely to publish their secrets. He had used bromo-iodized collodion, and a pure neutral bath. He kept some powdered marble, about half an inch deep, in his bath, which kept it neutral.

Mr. Cooper had used four samples of commercial bromo-iodized collodion—three or four prepared by himself—all with success. His bath was slightly acid with nitric acid. He had suffered much less with spots caused by dust than he used to do with the old developer.

Mr. Oakley had used gelatine dissolved in acetic acid, and he boiled this with a concentrated iron solution, and then added a little acetate of lead. The results were very satisfactory.

After some further conversation,

Mr. Hughes said the experience of Mr. Allen was simply negative, as was also that of Mr. Debenham. If they did not require either the physical or chemical aid of gelatine, and derived no advantage from its use, let them throw it out of the window. He quite agreed with those who said that all detail should be out before full intensity was obtained, and, properly used, this developer permitted this. He could understand that with certain kinds of lighting any change in the direction of greater intensity produced by the developer might give the effect of under-exposure. Regarding Mr. Johnson's remarks, he thought that gentleman did not do justice to his own intellect, when he said he understood less of the matter at the end of the evening that at the beginning. He for one had not referred to the collodion, &c., used, because he considered that would complicate rather than simplify the question. It was not the relation between the new developer and certain kinds of collodion, but between the old form of developer and the new form of developer, each being used in the ordinary well-understood conditions of the day, any of the excellent commercial samples of bromo-iodized collodion now so common being employed. As to the solution gelatinizing, that which Mr. Johnson mentioned as a disadvantage was really a great benefit; for whenever the temperature of the dark room was so low as to gelatinize a solution containing one grain of gelatine to the ounce, it was quite evident it was too low to produce good work, and the condition of the developing solution would be a hint as to the necessity of warming the room. All he asked of photographers was to take a sensible view of the matter, applying principles rather than adhering to formulæ, and just availing themselves of the power offered to them in the degree in which they required it, and no more.

The Chairman, in proposing a vote of thanks to the gentlemen who had read papers, remarked that failures were really steps to success; and a record of them was often more instructive than an account of successes. Regarding the question of temperature, he believed it was of much more importance than was commonly thought, and related the experiences in the photo-magnetic registrations at the Royal Observatory in confirmation. Since these had been conducted in a room with a constant temperature, many difficulties, and the necessity for constant variation in details of formulæ and manipulation, had vanished. The chemicals must be kept comfortable and warm, or they would not work well; and if the gelatine solution indicated when the temperature was falling too low, it would be a good thing. Regarding Mr. Cherrill's paper, he had no objection whatever occasionally to a good theoretical paper to increase their knowledge. Practice might increase skill, but not knowledge; and he should like to have a good theoretical paper from Mr. Johnson on the mathematical principles involved in his camera.

The Chairman then called attention to some very beautiful collodio-albumen pictures taken by Mr. W. D. Clark with Dallmeyer's new wide-angle landscape lens.

The proceedings were then adjourned until the Annual Meeting in February.

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Correspondence.

PERMANENCY OF ANILINE COLOURS.

Sir,—It is now many months since a discussion was carried on, through the medium of the News, respecting the use of aniline dyes, as applied to proofs on albumenized paper. The prevailing opinion was, I thought, then in their favour.

About that time I tinted photographic copies of natural history by the help of these dyes—objects that required unusually strong colouring, being exotic leaves, &c., of singular and exquistely beautiful markings. Although these proofs appear still to retain all their pristine freshness and strength of colouring, nevertheless I am satisfied that they must be on the decline, from the following untoward circumstance.

The proofs in question, being placed perfectly dry in an album, after a short period were found to have tinged whatever happened to have come in contact with their coloured surfaces (especially the yellows) with their own tints. This unexpected and undesirable occurrence has, of course, obliged me to remove them, at different times, to places of less consequence, to which I find they still continue to communicate their own particular hues. The above being the case, the brightness of the colours must surely be constantly and steadily deteriorating, and I am now desirous of enquiring of yourself, or readers better informed on chemical matters than myself, the rationale of the action of these dyes, which may reach to the prevention of the mishap complained of.

I have thought that a chemical combination was formed between the dye and animal substance albumen, sufficient to have fixed and rendered the colour a permanent one, which I can scarcely now hope to be the case. Can there be a kind of dry evaporation or sublimation taking place from the coloured surface of the proof, such as would be from camphor, iodine, and many other substances, when exposed to the air at ordinary temperatures? Information from yourself or numerous readers having reference, in any way, to the above-described annoyance respecting the aniline dyes will much oblige yours, very sincerely,

Henry H. Hele.

Teignemouth, Devonshire, January 6th, 1866.

[We have not observed such an effect ourselves. The supposition that the aniline, having entered into combination with the albumen, would have given it a fixed character, is but natural. It is possible, however, that more aniline may have been applied than was sufficient to combine with the albumen present, leaving some aniline free and volatile, which, being slowly vaporized, combines with the first organic substance, for which it has an affinity, with which it comes into contact.—Ed.]

SIR JOHN HERSCHEL'S CIPHER.

Dr. Phipson presents his compliments to the Editor of the Photographic News, and begs to submit the following interpretation of the cipher given in the last number of his valuable Journal by Sir John Herschel. Dr. P. has only had a short leisure to devote to it, therefore it is probable some words are not exactly rendered as they should be; nevertheless, the subject of which it treats will be seen:—

"Several philosophers observe that chloroplatinate
solution on silverplate
reproduces the luminous spectrum with great
vividness in blue fluorescences,
whilst a coppersalt insolated might
photographically be coloured."

London, 8th Jan., 1866.

THE DISCUSSION ON THE ORGANIC IRON DEVELOPER.

Sir,—The very valuable papers read by Mr. Hughes, Mr. Cherrill, and Mr. Cooper at the Photographic Meeting, and also the animated discussion which afterwards took place, and which so interested every one present, lasted till rather a late hour, or I should have liked to have made one or two remarks respecting the collodion which would, probably, be most suitable for the new developer. Possibly the various discrepancies which individual operators experience in their experiments arise mainly in the difference in the preparation of the collodion. For instance, one operator uses a preparation containing but a very small amount of bromide and a large portion of iodide. In such a case the gelatino-iron solution would be worse than useless. Again, another uses a collodion containing a large amount of bromide in proportion to the iodide. Now such a preparation, as every photographer knows, gives a very sensitive plate, but a very thin image if developed with the ordinary sulphate of iron alone. Now a collodion prepared as above stated, is undoubtedly the one most suited to the new developer, and no doubt the one used by Mr. Fry in getting such excellent results as he states he has succeeded in obtaining this winter. I would strongly recommend the operator to ascertain the proportions of the salts in the collodion he uses. If the maker will not inform him, he should purchase the collodion in the normal state, and add to it the iodide and bromide most suitable for the purpose for which he requires it. This is not so difficult a matter, and the experience he will gain will amply reward him for the little extra trouble. Do not let me be understood as insinuating that there are no good samples of collodion to be obtained ready for use. I could enumerate half a score that are first-class; but, unfortunately, in using an article of which we know nothing—no more than that we sometimes obtain good results, and at others the reverse, and that one sample will do for this, and will not do for that—it is that we are everlastingly trying to find out what collodions are the best for practical purposes. I say we are at sea in these matters, and that the sooner photographers begin to use an article which is not a secret preparation, and which they can understand and can vary and adapt to their various wants, then, I think, it will be found that the experiments of the various practitioners and the results obtained will not be so totally opposite in character as is often the case at present.—I am, dear sir, yours truly,

W. England.

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Talk in the Studio.

Restoring a Disordered Bath.—A correspondent says:—"Having had an old bath which seemed almost beyond cure, giving persistently stains and markings, after various remedies I tried the following:—I put into the solution sufficient distilled water to turn the solution turbid; I then put it into an earthern vessel and boiled it, or otherwise simmered it for two hours; after cooling, I tested the same, which was at 90 grains to the ounce; I then made it to 35 grains, and on trying it with litmus paper I found it to be neutral. I then made it slightly acid with "nitric acid," and I again commenced taking negatives. It worked excellently; the negatives came out full of detail, giving more sensitive plates than before treatment."

Keeping Plates and the new Developer.—A correspondent says:—"I have used Mr. J. Hughes' aceto-gelato even since first published, and like it much, but, unlike your correspondent Mr. Dunmore, I have never obtained sufficient density without intensifying. One of its advantages I do not remember to have seen referred to in the News, is, that it will enable a plate to be kept much longer before developing. I had occasion to photograph some tombstones at the cemetery upwards of two miles from my house. I tried several preservative processes without success (it was hot weather). At last I took up a plain wet plate, with blotting paper at the back, of course, and though an hour and a quarter had elapsed, it developed with ease, and without a stain, quite to the edges. I have found the same advantage several times since."

Palestine Exploring Expedition.—A Report has just been published by Mr. G. Grove, of the first expedition, in which he states that photography is being extensively employed in gathering records. Photographs of details to illustrate a plan of the great mosque at Damascus, and photographs, of a large size, of objects thus delineated for the first time, on the road between Beyrout and Damascus, have already been secured.

Mr. Palmer's Enlargements on Canvas.—Mr. Palmer writes to say that we have misunderstood him in reference to the method employed for enlarging on canvas. The method he described to us, and which we published a fortnight ago, is, he says, a method of printing on canvas, but not the method he uses with his enlargements. This he still keeps secret. He says:—"Although chloride of silver suspended in gelatine is used, it is prepared in every way different, and used in such minute quantities that, so far as the last two years' experience goes, all I have done (and that not a few) appear to resist the influences of heat or moisture; and so far as cracking, I have not seen one, and I feel that I can guarantee that they will not crack through the application of my process. I would not guarantee that every canvas by different firms is always blameless—that is outside my province—but I believe I could show that if two pieces of canvas known to be bad (as canvas sometimes is so under painting), one photographed on, the other only painted, that the painted photograph should not be worse than the painted canvas without photograph. Notwithstanding this, I have for a long time been impressed with the advantage to all, if photographs could be enlarged on the canvas in such a way as to become incorporated with the upper surface of the paint. I have succeeded in every way, and very easily too, and I am at once carrying it into effect. It is developed without gallic acid, neither gelatine nor any hygroscopic substance used; the photograph is part and parcel of the painted surface, so that we shall not have to deal with our fears on the cracking of gelatine and other such mediums in this department." As Mr. Palmer gave, as his reason for not before publishing that he used gelatino-chloride of silver, the fact that the secret was of importance to him in his business, we naturally thought that the secret was now made public. This, it seems, is an error.

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To Correspondents.

⁂ Presentation Print.—We hope to be able, on the 26th of this month, to present our readers with the promised specimen of Mr. Woodbury's photo-relief process. Agents and others requiring extra copies will please to communicate with the Publisher before Friday next.

T. T.—The collodio-chloride for printing on canvas should be prepared from a pyroxyline yielding a very powdery and adherent film. We are not certain that any commercial sample will answer. 2. The addition of chloride of silver to collodion would not produce quite the same effect as the precipitation in the collodion; the latter would be in finer particles. 3. Ether, essential oils, turpentine, &c., will dissolve both wax and resin. The best proportions, or the best method of applying, we cannot speak of with certainty, not having worked the matter out ourselves.

Zenophon.—It is a bad plan to mix the waste developing solution with the washing water, the silver in which is to be thrown down as a chloride. But the small proportion of gelatine which can be present will not retain the chloride in suspension; if it seem to do so you must dilute it, and be careful to wait until it precipitates. 2. We cannot direct you to any glass-room. For a personal visit and advice as to the arrangement of your contemplated erection, apply to Mr. H. P. Robinson.

J. B. Helston.—We have not the address of the correspondent in question. The name is not an uncommon one, we think; we know a medical man in London bearing it. 2. We see no reason to think it injurious. 3. In asking for a formula for an ammonia and iron developer, do you mean ammonia sulphate of iron, or solution of sulphate of iron with ammonia added? 4. There are various methods of producing transparencies for the magic lantern; but we cannot say which is best, as much depends on circumstances. Perhaps, where many are required, the wet collodion process and camera printing is most desirable. 5. If you have never albumenized any paper, it is probable that you may spoil a good part of the first quire you try; but still it may be worth the effort. To each ounce of well-beaten albumen add one drachm of water and six or eight grains of chloride of ammonium, and float for a few seconds.

Bromo.—If you attempted to make collodio-chloride with iodized collodion, it is very likely that you would not get an image. Plain collodion means collodion without any iodide or bromide. The collodio-chloride must be poured on the enamelled side of the plate.

K. L.—The black varnish used for backing glass positives will answer. If the film have a tendency to crack or give a jagged edge when drawn on with an etching point, add a little bees' wax dissolved in turpentine, which will make the film more tough. 2. Sometimes water colours, sometimes transparent colours, in a varnish medium, are used.

J. H. W.—Mr. England will shortly give some further details of his tent in our pages. It is not, that we are aware of, made commercially. 2. We cannot state the exact ratio of rapidity of the two lenses by the maker you name; but the single lens covers best, and is, we think, most desirable for landscape work. 3. Paraffin may be had of photographic chemists; we cannot tell the price. 4. Col. Stuart Wortley recommends ten minims of formic acid, thirteen minims of acetic acid, and eleven grains of protosulphate of iron in an ounce of water.

W. C.—Use a less proportion of gelatine, and warm the solution sufficiently to permit filtering. Use the solution fresh as possible, and in cold weather increase the proportion of iron.

C. H.—It is not necessary to dry prints between the washing to remove free nitrate, and the operation of toning.

Wm. Pousty.—The silicate of soda or potash, known as soluble glass, may be procured of almost any chemist.

Wm. Sanday.—The reason why the image is less intense where a white background is used than where a dark background is employed, is simply this: in the latter the bulk of the free silver on the plate is thrown down on the lights of the figure itself, the background taking but little of this free silver; whilst a white background, being a large space requiring a dense deposit of silver, leaves less for the light portions of the figure, which are accordingly less intense. The intensity of the image is chiefly derived from the free nitrate of silver on the plate.

W. Williams.—There is no work especially devoted to photographic engraving; the descriptions of various methods have appeared in our pages from time to time. There are several modes of obtaining a photographic image on a metal plate, and these vary according to the treatment in other respects. If the plate be covered with a film of asphaltum and exposed under a cliché, the parts upon which light acts will become insoluble, whilst the other portions may be dissolved by means of an essential oil or ether. A carbon print can also be produced on, or transferred to, a metal plate. 2. An enlarging camera like that described in our Year-Book for 1865 is the cheapest apparatus we know for enlarging.

An Assistant to a Photographer.—The best plan to deal with waste developing solutions is to add them to the old hypo solutions, and reduce as a sulphide. We find a business order in your letter intended for our publisher; by thus combining a communication for the publisher with a letter addressed to the Editor, you cause delay in attention to the former.

A Constant Reader.—The *Bulletin Belge de la Photographie*, 16, Place Sainte-Gudule, Bruxelles. We do not know the price of advertisements in foreign journals.

D. Winstanley, Junr.—The question is difficult to discuss without diagrams. Perhaps the simplest plan of illustrating the case is to take a rectangular building with four opaque walls, and place a ridge roof of glass upon it; now see if more light can find admission through the two sloping sides of the roof than would be admitted if the roof were removed and an aperture left, or a flat roof of glass (forming the base of two triangles, of each of which the sloping sides would form the hypothenuse). It is the aperture, and not the glass, which admits light. If the roof be of the lean-to form, with a single slope, the same will be true. If the wall on which the lower end of the sloping roof rest be opaque, an advantage is gained by the slope by the practical admission of a certain amount of side light; but if, instead of an opaque wall, this support were of glass, it would not matter, so far as the admission of light is concerned, whether the roof were flat or sloping. Another question of course arises, into which we do not enter here, as to the amount of light lost by reflection when the light impinges on the glass at an angle.

Thomas Ayers.—We shall have pleasure in receiving concluding portion of your communication.

George Dawson.—We have received another letter from Mr. Dawson, stating no new fact, but styling the remarks in Mr. Glaisher's letters as "uncourteous" and "inconsistent with facts." As no possible end can be gained by the reiteration of mere assertions and personal statements, we must decline to insert further communications on this subject. We permitted Mr. Dawson to contradict in our columns our own statements, which we knew to be true. This necessarily called from Mr. Glaisher an emphatic statement of the truth. We declined the insertion of other letters bearing the signatures of eminent members of the Society verifying our own and Mr. Glaisher's statements, as we deemed it unnecessary to import any further personal element into the business. The matter now only rests on the relative credibility of Mr. Glaisher and ourselves on the one hand, and of Mr. Dawson on the other. We are quite satisfied to let it rest on this issue; and, so far as our columns are concerned, the matter is at an end.

Several Correspondents in our next.

Errata.—In Mr. Glaisher's first letter in our last, p. 2, the date of the letter, owing to a printer's error, is given as "January 21st;" it should have been, according to copy, "January 28th." The word "letter" on the 7th line from the bottom, 1st column, p. 3, should have been "paper." In Mr. Skinner's letter, on the 29th ult., p. 618, the word "cure" is substituted for "cause," and "cleanliness" for "clearness."

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Photographs Registered during the past Week.

Mr. M. Boak, Great Driffield,
One Photograph of Great Driffield Church.
Mr. Thos. Ladmore, Hereford,
Two Portraits of J. King King, Esq., M.P.

THE PHOTOGRAPHIC NEWS.

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PRESERVATION OF NATIONAL PORTRAITS.

On another page will be found a communication from Mr. McLachlan, of Manchester, from which it will be seen that a scheme which he promulgated some years ago is now obtaining definite official recognition. The interest and importance of securing the preservation of trustworthy national portraits, as means of giving increased vitality and value to history, are obvious, and the fitness of photography for such work must at once commend itself to everyone. An authentic portrait of Shakspere, however crudely executed, would possess more value than the most exquisite painting the authenticity of which was doubtful. Cooper's miniatures of Cromwell possess more interest as trustworthy portraits of the man, than they do examples of some of the finest examples of miniature painting produced in this country. Valuable as are the fine productions of the Grainger Society for the publication of national portraits, established and chiefly managed by Dr. Diamond, what an increased value they would possess had they been limned by the unerring pencil of the sun instead of by fallible human draughtsmen!

The present is just the period which makes such a scheme possible. With two or three methods of enamel photography recently brought to a high state of perfection; with Swan's carbon process just rendered practicable as well as perfect; with Woodbury's photo-relief printing process just completed, we have the ready facilities for producing unfading photographs. The art is thus relieved from a reproach which, until recently, was a sufficient answer to all suggestions for rendering it available in perpetuating any kind of national records. Now all this is changed: photographs may be produced which shall be as enduring as the material upon which they are depicted, and may take their place amongst the most permanent examples of pictorial art. We think Mr. McLachlan's suggestion is a most important and worthy one, and will, we trust, receive the support of all who can aid him. We hope the movement—which, although official, is local—is one which will soon receive national recognition.

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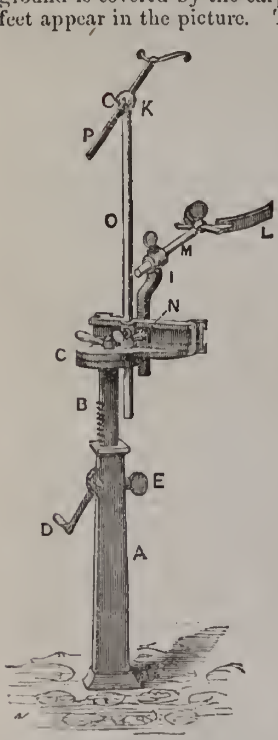
A "PATENT POSING APPARATUS."

"Please let me sit without that horrid head-rest!" is a common appeal made by the most gentle of the photographer's sitters, as preparations are made for the pose. It is to "the iron vice into which the victim's head is screwed, and which is believed to be the sole remnant of the well-selected apparatus of the Spanish Inquisition," a facetious writer attributes the multitudes of frightened, frowning, or fatuous faces too commonly rendered by photography. A few pseudo-art-critics, who have condescended to enlighten photographers on the conditions of success in their art, have suggested that the imperfect definition arising from the movement of a sitter has rather an advantage than otherwise, and that if the face of a fair girl was presented, like Portia's "Dardanian wives, with bleared visages," she should congratulate herself on having escaped the hard, sharp, cutting outlines so common in photography, and so repugnant to good art. Notwithstanding, however, the frequency of protests made with more or less show of reason against the head-rest, we do not know of any really able photographic portraitist who is willing to dispense with it in his regular operations; a stay or rest of some kind being absolutely necessary in almost all cases to check the, often unconscious, movement of the sitter which effectually mars delicate definition, and is fatal at times to the whole expression and character of a head.

Nevertheless, the ordinary head-rest is a nuisance. It is cumbrous, unwieldy, and ill-adapted to its purpose. It is difficult to use at all without discomfort to the sitter, and when used most skilfully is so narrow in its range of application, that the photographer is confined to certain limited number of positions in which he can render it really available, a circumstance which probably contributes materially to the perpetuation in photographic portraits of certain stock conventional poses and arrangements. Unyielding and unaccommodating as the old head-rest undoubtedly is, and slight as its capability of adaptation, it has been by no means universally efficient in its limited range. A rest for the head is of little value if the whole body be gradually and unconsciously moving, a circumstance by no means uncommon where a standing pose is protracted. Furthermore, the old rest frequently obtruded its presence awkwardly into the picture, notwithstanding the various ingenious devices with which the photographer tried to hide it or disguise its purpose.

Some few attempts have been made to effect an improvement, but they have been rather palliatory than curative; they have mitigated the evils of the crudest form of rest by modifying it in form or arrangement; but, notwithstanding the progress of the art, no radical improvement seems to have been attempted in the purpose and construction of the head-rest. Mr. Sarony, of Scarborough, whose name is well known to photographers as one of the ablest and most enterprizing of portraitists, has, however, recently patented a new "posing apparatus, or universal rest," which promises to afford the sitter a support in almost any position, which is as efficient as it is novel, resting the body as well as the head, and securing a feeling of ease and repose in place of the constraint and imprisonment so often felt when the old rest was used. With the utmost firmness and rigidity in the support, there is in the several parts such a facility of adaptation to any position, and to almost any part of the standing figure, that whilst the adjustment is made in less time than we can write the description, yet the figure is perfectly supported in any position, so that it need not move during the longest exposure. Some of the examples of portraiture which we have seen effected by its aid are marvellous in this respect. Here is a *danseuse* so balanced that the centre of gravity overhangs the base, a position which could not by almost any muscular power be maintained without support for more than a second or two; yet this was taken in a dull light, requiring nearly a minute's exposure. There is at the same time no appearance of a support of any kind afforded, the expression and whole effect indicating perfect ease and freedom from effort. A number of other portraits are striking for their entire ease in expression and absence of the conventional photographic positions. The especial advantage obtained is that this "rest" supports, without constraining the sitter; that it permits ease and grace in pose before difficult to obtain; and it is so pliable in its arrangements, that the photographer can use it with much less trouble than is necessary for the old intractable rest.

It is not easy to describe this apparatus so as to give the reader an efficient idea of its arrangements, but we will briefly indicate its general features. It consists primarily of an iron pillar which is screwed to the ground to secure a base of the utmost rigidity. The portion screwed to the ground is covered by the carpet, so that no obtrusive iron feet appear in the picture. The diagram gives a back view of the rest. The column, A, is sufficiently firm to carry all the other parts, and bear any strain which can be applied to it, without vibration. Within this another column, B, slides, being moved up and down by means of a rack and screw.* Attached to this, about three feet from the ground, is a cross-piece, C, which moves on a centre, being readily placed in any position, and fixed rigidly by the slightest touch of the small lever for the purpose. In this cross-piece, the back rest, I, M, L, is fixed, and possesses a lateral movement of about twelve inches, which, in conjunction with the rotary movement, gives wonderful facility in adjusting the back rest to any part of the back or side of the sitter, no matter what his position. The portion of the back rest, L, which comes in contact with the sitter, has an ingenious movement which permits it to receive the broadest back or clasp the daintiest waist. The portion which constitutes the head-rest proper resembles those commonly in use, except that it is adapted in form to rest the head without interfering with the *chignon* so commonly worn in the ladies' head dress. One of the most novel and excellent features of this rest is the facility afforded for attaching a chair to it, and bringing that chair into any position in relation to the model, so that it may be used as a leaning support without any constraint in the position. In the cross-piece already referred to is a groove into which a semi-circular band of iron slides; upon this is hung, at any height, the back of an ornamental chair, which may be swung round into any position and clamped, securing the utmost ease and support to the model. The back of the chair is detached from the seat, which permits its elevation or depression, the long fringe with which it is trimmed concealing the junction between it and the seat. Another of the many adaptations it possesses consists in an arrangement for attaching the front of a carved oak cabinet behind a standing figure, which may lean upon it without any constraint. There are various other appliances, into detail of which we need not enter here. The feature which struck us most, and which can be expressed by description least perfectly, was the admirable facility and rapidity with which the rest could be brought into contact with any part of the standing or leaning figure, without disturbing the sitter in the least, so as to constitute a firm support, and the completeness with which firmness and rigidity could be secured in all these apparently flexible parts, without the apparent exercise of effort in the photographer.



Mr. Sarony assures us that the extraordinary facilities it has afforded in his own establishment, during the last few months of dull weather, in securing sharp pictures with the necessary long exposures, and the unexpectedly increased number of sitters during that period on account of the comfort both in sitting and in the ease and freshness of pose rendered possible, have been as surprising as gratifying to himself, and rendered him the more anxious that photographers generally should know of the existence of such a valuable adjunct to successful photographic portraiture.

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FURTHER OBSERVATIONS ON THE PREPARATION OF THE IRON DEVELOPER SO AS TO PRODUCE DENSE NEGATIVES.

BY JABEZ HUGHES.*

When I last had the honour of introducing this subject before the Society, time did not permit its discussion. I take for granted, however, that members are sufficiently familiar with it not to require the facts or formulæ to be re-stated. Continued personal experience confirms my conviction of the advantage gained by adding gelatine to the developer. I have, however, acquired broader and more general views as to its use, which on some future occasion I may have the opportunity of elaborating. I think for practical use the subject will be better understood if we bear in mind the twofold manner in which gelatine affects the developer—mechanically and chemically. Mechanically it causes the solution to be thicker and more viscous, so that it flows more easily over the plate, and more readily unites with the nitrate of silver solution in and on the film. Chemically it assists the acetic acid in checking the rapidly reducing power of the iron, so that the precipitated silver more perfectly represents the action of light. There are various ways of uniting the gelatine with the iron. Whichever way be used the solution will acquire the mechanical and chemical alteration; but some methods cause the change to be principally mechanical, and others cause it to be principally chemical.

When gelatine is acted on by dilute sulphuric acid, and the product neutralized as near as can be by protoxide of iron—Mr. Carey Lea's method—the chemical change is produced in an exalted degree. Also, when gelatine is acted on by dilute sulphuric acid, then neutralized by ammonia, and the resulting fluid added to a plain solution of protosulphate of iron—Mr. Cherrill's method—the chemical change is effected in proportion to the quantity added. When, however, gelatine is dissolved in dilute acetic acid—Clericus's method—and added to a plain solution of iron, then the change is much less chemical, and is more mechanical. When gelatine is dissolved by heat in water, and, without being acted on at all by acid, is added to the usual developer, then the change is least chemical and most mechanical. These variations embrace the whole range of the collo-iron developers, from the most difficult to prepare to the most simple, from the strongly chemical to the simply mechanical. Of the two first, which I term chemical methods, I much prefer Mr. Cherrill's. It is easily, simply, and certainly prepared, and is capable of producing the faintest or the strongest effects, according to the quantity used. It is much superior to Mr. Lea's, which sadly lacks some of these desirable points. It is necessary this should be distinctly stated, as an advocate of Mr. Lea's method is doing serious injury to the subject by maintaining the contrary. Of the two methods of producing the mainly mechanical effects, I now prefer the adding of plain unacted-on gelatine to the usual developer, as being more simple and in its nature more universally applicable than the one known as Clericus's.

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* In an announcement in our advertising columns several of the diagrams will be found, a reference to which will aid the reader in understanding the description. The apparatus itself may be seen at Mr. James How's establishment in Foster Lane. Mr. How is, we understand, agent for the new "Rest."

* Read before the Photographic Society, January 9th.

Our ideas will be clearer if we bear in mind the different action of the iron-salt and gelatine. Protosulphate of iron it is that develops the picture; gelatine will *not* develop the picture. It checks, modifies, and retards development. The term "ferro-gelatine developer" is a misnomer; it is putting the *carte* behind the *visite*. "Gelatino-iron" or "collo-iron" is correct, because it is the iron and not the gelatine that develops; the latter only qualifies the manner of development. By using proper terms the subject is better understood; and photographic nomenclature is already too loose to permit us to be indifferent.

It is usually said that any kind of gelatine will do; I cannot answer for this; I rather doubt it. My own practice is chiefly confined to that known as Nelson's, and to it all my allusions refer.

Hitherto all the recommendations to use gelatine in the developer have been accompanied with certain formulæ of strengths of iron, &c. I have published different formulæ myself, and others have done so too. To those who have succeeded with these I recommend them to persevere. To those who have failed, I beg them to reconsider the matter, and to take a larger and more comprehensive view. Do not alter your present developers. Continue to prepare them as before, and merely add the gelatine as a modifying element. Each person works best with that strength of iron to which he is habituated. Let each add to his solution just as much or as little of the plain or modified gelatine as his necessities suggest. As a starting-point, let me ask any one of you, before you make any alteration, what are the results you now obtain? "Mr. A 1," for example, "tell me how does your developer behave? Do you get enough, or very nearly enough, intensity at once?" You answer, "Yes, I have no difficulty in getting sufficient density." "Very well, you have no need to come to gelatine for chemical help. Any addition of Mr. Cherrill's solution of 'sulphuro-gelatine' (as I have ventured to term it till its exact nature is settled) will only make your pictures hard and wiry, unless you give an increased exposure. Tell me, does your developer flow so uniformly that no markings or stains are caused by its acting too quickly?" You reply that you are not troubled with these now; you were in your early days, but you have got over all that. Then I say, "Mr. A 1, you are a happy man. Don't add gelatine in any form to your developer: it will only disturb your exquisite working. 'They that be whole need not a physician.'" "Now, Mr. B, how does your developer behave?" You say your solution flows over right enough, but you rarely get enough density. You depend on pyro and silver to intensify, and sometimes have to use a second dose. "I am happy to say there is help for you. Add a few drops—say ten minims—of the sulphuro-gelatine to each ounce of your developer, and try its effect. If they do not cause density enough, try twenty, thirty, or more, until you get sufficient. Do not add too much, or you will rush from one evil to a greater:—

"''Tis excellent
To have a giant's strength, but 'tis tyrannous
To use it like a giant.'"

The next one, Mr. C, says he can always get density enough when the solution flows over properly, but it sometimes goes irregularly, leaving a mark occasionally in the corner, but frequently in the middle of the plate. To such a one the advice is, take advantage of the mechanically altered solution by adding, say, half a grain of gelatine to the developer. This will not materially increase the intensifying power, but it will considerably improve the flowing properties of the solution.

There is one more class of persons who have their troubles; their developer will flow irregularly, and will not yield intensity. These persons are recommended to the sulphuro-gelatine solution, and to add perhaps as much as thirty minims—more if necessary—to each ounce of the developer until the wished-for density is obtained. This quantity of the gelatinous solution will most probably have communicated all the proper flowing properties that are wished. If not, add a quarter or half a grain of plain gelatine to each ounce of developer.

In this homely manner, I suggest that everyone can draw what aid he requires, little or much, from the gelatine. No one knows where the shoe pinches like the wearer; no one knows how much or little a developer requires to improve it, but the user. What exactly suits me I know does not suit many of my friends. On the last occasion I gave formulæ, accompanied with suggestions for modification according to circumstances. This time I enlarge, and prefer to give general principles; and, by attention to them, every person of intelligence can, without altering his acquired daily routine, derive all the advantages that flow from the use of gelatine in the developer.

After all, the most important organic element to mix the developer is "with brains, sir!"

THE ORGANICO-IRON DEVELOPERS.

BY H. COOPER, JUN.*

Having pledged myself to write a few words on the new developers as an addendum to Mr. Hughes' paper, I must redeem my promise; but I really have nothing new to say on the subject. Since the meeting when the new developer was first brought before this Society, our experience with it has been considerably enlarged; I therefore hope that we are now qualified to form a moderately correct estimate of its advantages or disadvantages. As, during the last few months, I have written several papers on the new developers, I shall not trouble you with any details of manipulation or preparation, but content myself with referring you to the almanacs for this year of the Photographic News and the *British Journal of Photography* for the latest formulæ.

I, as you are aware, have been rather enthusiastic in my praise of the new developer; yet, although I have experienced such great benefit from its use, you must not suppose that I have been blind to the many drawbacks that it may possess under certain circumstances. But its disadvantages seem to have been almost entirely felt by those who have no necessity to use it. It is claimed for it that it will enable you to get a rich non-actinic colour of deposit in your negative with great delicacy of gradation, when by the ordinary mode of working you could only get pictures thin and grey, which required a great deal of troublesome intensification. It stands to reason that if you already obtain negatives of sufficient richness and density, there is no occasion to use the new developer; in fact, instead of being beneficial, it will prove the reverse. This idea, which is based upon theoretical considerations, is amply borne out by practice. I could mention the names of several of our first photographers who have been much dissatisfied with the new developer; but, on the other hand, the number of those who have found the greatest benefit from it far outstrips them. It should be remembered that the first did not require it, the latter did; and I am pleased to think that all that has been said in its praise is substantiated by their experience. In my glass room, which is simply a conservatory, I have very little control over the light, and very often I could only obtain flat and feeble pictures. Since I have used the new developer my pictures have been very much better as regards modelling and gradation; and I can affirm with great confidence that this improvement is principally due to the use of gelatine in the developer.

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* Read before the Photographic Society, January 9th.

I would especially recommend the new developer to those who are obliged to work in ill-arranged studios, in which, perhaps, there may be a large quantity of diffused light, which always tends more or less to produce a feeble, foggy picture. To those who can properly arrange their light, so that the resulting pictures are all that can be desired, I say, do not waste time by trying the gelatino-developer.

It is only of use to those who have failed to overcome, in other ways, difficulties that they may have experienced, such as foggy negatives, thin grey deposits, and stains or streaks *not proceeding from dirty plates*. It appears to me that the new developer will prove a great boon to the landscape-photographer, who is often obliged to work under very trying circumstances, both to negative and temper. The tendency to immunity from stains and fog, which the new preparation gives us, becomes more valuable than ever when we are working with a tent or developing-box, and when, either from heat or from its having been kept a long time after its removal from the bath, the plate has become partially dry.

In taking portraits of children it may prove valuable, as by using a very strong solution of iron, with enough organic solution to prevent fog, and a few minims of formic acid to each ounce of developer to give greater delicacy, the exposure may be very much shortened without materially deteriorating from the excellence of the finished picture. In concluding these very brief remarks, I would ask all those interested to give the new developer a fair, impartial, and unprejudiced trial, bearing in mind that its advantages or drawbacks will appear more or less according to circumstances, and that, therefore, the unsuccessful ones ought not to throw doubt upon the statements of the successful, nor, *vice versâ*, should those who have experienced benefit from it think that the non-success of others is always due to mismanagement or want of experience.

THE NEW ORGANIC IRON DEVELOPER.

BY NELSON K. CHERRILL.*

Gentlemen,—In coming before you this evening with a paper upon an interesting, if not important subject, I feel myself placed in a somewhat difficult position, by the fact that you have already heard two very excellent communications upon the same subject.

It will be my endeavour to bring before you a few theoretical considerations in which I hope to show some analogy between the chemical effects produced by various developing solutions, and to gather from them, though but imperfectly (owing to the difficulty of the subject), some idea as to the line of experiment which must be pursued in order to obtain that definite information which can alone lead us to suggest *real important* modifications.

As a preliminary step, I must say a word or two upon the mechanical action of the developing solution. Of course the first and most obvious result produced by a solution such as first proposed by Mr. Hughes, is that, owing to its thick viscous character, it is very easy to use; it flows well and evenly, and so avoids stains. But I venture to think that it has another action. It is fair to suppose that the silver precipitated on the plate is *formed* in the solution in chemical atoms, and that these are only precipitated on the plate by first cohering into small lumps or grains (which may generally be seen in the microscope in a finished negative). Of course the *position* which these lumps or grains occupy on the plate is determined by that state of the latent image which causes the formation of the picture, and which, for the sake of convenience, I shall call chemical polarity.

It will now be easily seen that if these atoms of silver are formed in a viscous solution they will not cohere so readily, and will consequently fall to the plate much more slowly than if the solution were in simple water.* The grains thus falling in a state of finer division will render the deposit blacker, and by falling more slowly each grain will have more time to get into its proper place, and so the image will be more delicate. It may be remembered here, as analogous cases, that the more slowly any solution crystallizes the more perfect will be the crystals; and that if a very viscous solution is employed, the atoms *may* never cohere, and so, though formed, remain in suspension, as in Mr. Wharton Simpson's collodio-chloride of silver printing process.

I must now direct your attention to the chemical action of various substances which have been added to the developer. The first case will be that of using simply sulphate of iron and acetic acid to develop a plate containing a latent image and free nitrate of silver. The decomposition will be as follows:—

Iron has more affinity for oxygen than silver, therefore the iron in the sulphate will remove the oxygen from the nitrate of silver, and the nitric acid of the nitrate of silver, being incapable of entering into chemical combination with pure silver, will go along with oxygen to form a per- or sesquisalt of iron. The reason for this is evident. The iron is already in combination with sulphuric acid and oxygen; it could not, therefore, take the oxygen from the nitrate of silver without taking the nitric acid at the same time, because protosulphate of iron + oxygen forms no chemical compound at all, but when it takes the nitric acid too (which exists in the nascent state and in exactly the right proportion), the sesquisulphate and sesquinitrate of iron will be found,

$$Fe_2\,O_3\,3\,SO_3 \text{ and } Fe_2\,O_3\,3\,NO_5.$$

This, which we may call the first decomposition, leaves free silver (in the nascent state), which would be precipitated over the plate all at once if it were not for the acetic acid. It is from the action of acetic acid in restraining the development—*i. e.*, in preventing this sudden deposition of silver—that I wish to derive some idea of a theory which would account for the action of glycocine or other substances. Acetic acid is an organic compound formed by the combination of three equivalents of oxygen with three of hydrogen and four of carbon, called for convenience acetyle (Ac). The formula for acetic acid is thus AcO_3+HO.

If we were to rob acetic acid of one equivalent of its oxygen, and so have the formula AcO_2+HO, we should have a new acid called aldehydic acid. This new acid is *capable* of combining with oxide of silver, to form a compound called aldehydate of silver, $AgO\ AcO_2$.

This aldehydate of silver is capable of depositing silver in the metallic state under certain circumstances; when it does so, its decomposition is most simple; the one equivalent of oxygen combined with the silver goes to the aldehydic acid to form acetic acid, and so liberates the silver.

Seeing this, then, and knowing that the silver liberated in the first decomposition of the developer and nitrate on the plate was in the nascent state, and therefore in the best condition to effect decomposition, does it not seem that the most simple chemical decomposition and recomposition of the acetic acid, effected by this free silver, would account for the whole phenomenon of the restraining agency of acetic acid?

It would be briefly stated thus:—The nascent silver would seize on the oxygen of the acetic acid, thereby converting itself into oxide of silver, and the acetic acid into aldehydic acid. These two would combine to form aldehydate of silver, and this be decomposed into metallic silver and acetic acid, as the chemical polarity of the plate might direct.

We have thus seen a way in which, in perfect conformity with the rules which govern chemical decomposition, the phenomenon of development may be explained. I shall have further to submit to you some cases which would seem to point to a sort of general analogy existing between all the different substances employed.

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* Read before the Photographic Society of London, January 9th.

* May not this account for the objection which has been raised to the use of alcohol?

Formic acid reduces the oxide of silver in a way somewhat resembling that of the acetic, the main difference being that in the one case the result is still acetic acid and silver, but in the other the acid is eventually decomposed. The decomposition in this case is sufficiently intelligible—

$$2AgO + C_2H_2O_4 = 2HO + 2CO_2 + 2Ag.$$

Acetic aldehyde ($C_4H_4O_2$) is a substance known to reduce silver from its oxide, forming aldehydic acid, which would carry on decomposition, as before mentioned.

Formic aldehyde ($C_2H_2O_2$), a very similar substance, might be thought to have much the same effect.

The composition of sugar of milk, which is a restraining agent, used with great effect by M. Kaiser, of Berlin, is $C_{12}H_{12}O_{12}$. This substance can easily be converted into two equivalents of lactic acid ($C\ H_6O_6$) (just one half the number of equivalents of each element); and lactic acid is generally regarded as *formic acid* coupled with *acetic aldehyde.* This is very simply shown in symbols:—

$$C_6H_6O_6 = C_2H_2O_4 + C_4H_4O_2.$$

From this we see that there is, or at least may be, some chemical analogy between development restrained by sugar of milk, and that restrained by acetic acid.

We now come to the consideration of the analogy which exists between glycocine and acetic acid in development. I need scarcely inform you at this time that glycocine is formed by boiling gelatine in strong acids, and in other ways not yet applied photographically.

Before making any further remarks upon this substance, I must be permitted to withdraw a statement made some time ago as not being supported by any evidence, and as therefore likely to mislead others.

I said that if sulphate of glycocine with sulphuric acid in excess were neutralized with ammonia, we should most likely have a compound of sulphate of ammonia and sulphate of glycocine. But I am led to think that a powerful base like ammonia would decompose the sulphate of glycocine after having first neutralized all the sulphuric acid. The chemical formula for glycocine is $C_4NH_5O_4$.

I must now diverge again for a moment to introduce to your notice another compound homologous with glycocine. It is called alanine. Its composition is $C_6NH_7O_4$. This substance has not, as far as I know, made its appearance, by name at least, among the photographic chemicals; but it is so entirely similar to glycocine that I must use it in order to point out the present relation. Hyponitrous acid, NO_3, acting upon alanine, forms *lactic acid*,

$$C_6NH_7O_4 + NO_3 = HO + N_2 + C_6H_6O_6;$$

and there is little doubt that hyponitrous acid, acting upon glycocine in a similar manner, forms glycolic acid,

$$C_4NH_5O_4 + NO_3 = HO + N_2 + C_4H_4O_6.$$

It will be seen from this that glycolic acid bears exactly the same relations to glycocine as lactic acid does to alanine.

We have also seen that glycocine and alanine are entirely similar substances, and that alanine can be decomposed into lactic acid; it may, in fact, be considered as an amide of that substance, that is, of formic acid and acetic aldehyde. Hence, by analogy, glycocine may be regarded as an amide of glycolic acid, that is, of formic acid and formic aldehyde. Thus we see also that glycocine, or glycolic acid, may act in a manner analogous to that of acetic acid.

There are two or three practical points which I wish to derive from these theoretical considerations:—

1st. That owing to the ease with which glycocine, or the compound of it, gives off oxygen, when under favorable circumstances, and also to the fact that acetic acid is sufficient to form with oxygen a persalt of iron, the developer will become saturated with a sesquisalt of iron in an unusually short space of time. To avoid this, the iron may be mixed with the organic substances without the addition of acetic or other acid. The acid may be added to a small quantity at a time, enough for a few days' use. The developer may thus be kept for any length of time.

2nd. That owing to the fact that nitric acid (NO_5) soon forms hyponitrous acid (NO_3), when acting upon organic substances, and also that NO_3 will decompose glycocine into glycolic acid, it seems probable that nitric acid might afford a much better means of making the glycocine for photographic purposes: at least this method would be worth trying.

I have thus endeavoured to show you some points in which the new substance glycocine may be analogous in its actions to acetic acid. The reactions of complex organic substances are so various and complicated, that it is difficult to speak with certainty about them. I hope that these suggestions of analogy may be worked out in time, and that from them we may derive some useful practical information. Suffice it now to remind you, that true and valuable guides to practice can only be derived from a knowledge of principles; that the modifications of this developer, which have been already suggested, can only be tried theoretically by the light of increasing knowledge, or practically by their behaviour under the most difficult circumstances; and that in whatever way we study the various points which science brings before us, whether by empirical experiments or by analytical research, we must never lose sight of the truth which comes before us hourly in these advancing days of the art, that "as yet we know nothing as we ought to know."

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ERRORS IN PICTORIAL BACKGROUNDS.

BY J. WERGE.*

WE have recently had a few papers on the necessity of art culture and art knowledge in relation to photography, but they have chiefly been of a theoretical and speculative character, few, if any, assuming a practical form. "Apply the rod to teach the child" is an old saying, and our artist friends and teachers *have* applied the rod and belaboured photography most unmercifully, but they have *not* taught the child. They have contented themselves with abusing photographers for not doing what was right, instead of teaching them how to avoid what was wrong.

It will be my endeavour to point out, in this paper, some errors that have crept into photographers' and artists' studios, and I hope to be able to suggest a remedy that will lessen these evils, and elevate photography in the scale of art. The faults in pictorial backgrounds that I invite your attention to, arise from the neglect of the principles of linear and aerial perspective. I do not speak of the errors in perspective that may exist in the backgrounds themselves, viewing them as pictures; but I refer to the manifest fault of depicting the sitter—the principal object—according to one condition of perspective, and the background that is placed behind him according to another. An unpardonable error in any work of art, whether photograph or painting, is to represent a natural object in an unnatural position. By this I do not mean an awkward and constrained attitude, but a false position of the principal subject in relation to the other objects by which it is surrounded. We frequently see portraits, both full-length and three-quarter size, with landscape backgrounds—or a bit of landscape to be seen through a painted or actual window—of the most unnatural proportions in relation to the figure itself. The head of the subject is stuck high in the heavens—sometimes so high that, in relation to the painted landscape, nothing shorter than a church steeple could attain such an altitude. The trees and castles of the pretty landscape, supposed to be behind the sitter, are like children's toys; the mountains are like footballs in size, and the "horizon" is not so much in relation to the figure as the width of a fishpond is to a man standing on one side of it. It must be admitted that artists themselves have set this bad example of departing from truth, to give increased importance to their subjects, by placing their figures against diminutive backgrounds; but that is a liberty taken with nature which photographers should neither imitate nor allow. Photography is, in all other respects, so rigidly truthful that it cannot consistently sanction such a violation of natural laws.

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* Read at a meeting of the South London Photographic Society

Pictorial backgrounds have usually been painted on the same principle as a landscape picture, and one of the earliest things the painter has to determine is where he shall represent that line where the sky and earth appear to meet—technically, the *horizontal line.* This settled, all the lines, not vertical or horizontal in the picture, below this are made to appear to rise up to it, and those above descend, and if all these are in due proportion the perspective is correct, no matter whether this governing line is assumed to be in the upper, lower, or middle part of the picture. A painter can suppose this imaginary line to be at any height he pleases in his picture, and paint accordingly. In photography it is invariable, and is always on a level with the lens of the camera. To illustrate the relation of the horizontal line to the human figure, when a pictorial background is to be introduced, let us imagine that we are taking a portrait out of doors, with a free and open country behind the person standing for his carte de visite. The camera and the model are, as a matter of course, on the same level. Now focus the subject and observe the linear construction of the landscape background of nature. See how all the lines of the objects below the level of the lens run up to it, and the lines of the objects above run down to it. Right across the lens is the horizontal line, and the centre is the point of sight, where all the lines will appear to converge. Suppose the lens to be on a level with the face of the subject, the horizontal line of the picture produced on the ground glass will be as near as possible as high as the eyes of the subject. Trees and hills in the distance will be above, and the whole picture will be in harmony. This applies to interior views as well, but the ocular demonstration is not so conclusive, for the converging lines will be cut or stopped by the perpendicular wall forming the background. Nevertheless, all the converging lines that are visible will be seen to be on their way to the point of sight. Whether a natural background consisted of an interior, or comprised both—such as a portion of the wall of a room and a peep through a window on one side of the figure—the conditions would be exactly the same. All the lines above the lens must come down, and all that are below must go up. The following diagrams will illustrate this principle still more clearly.

Fig. 1.

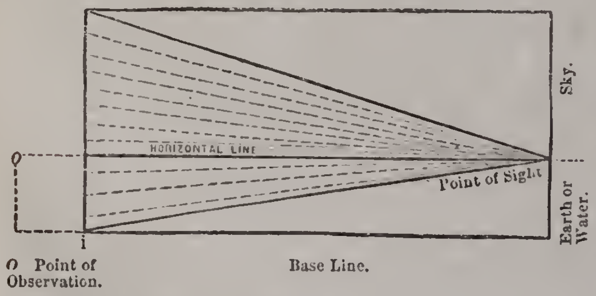
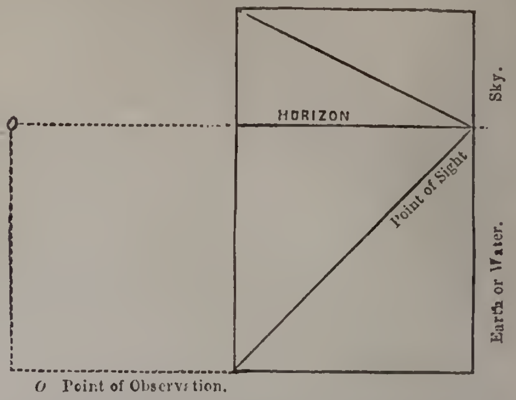


Fig. 1 is a section of the linear construction of a picture, and will show how the lines converge from the point of observation to the point of sight. Artists, in constructing a landscape of an ordinary form, allot to the sky generally about twice the space between the base and horizontal lines. But for portraits and groups, where the figures are of the greatest importance and nearer to the eye, the proportion of sky and earth is reversed, so as to give increased value to the principal figures, by making them apparently larger, and still preserving the proper relation between them and the horizontal line (see fig. 2). This diagram represents the conditions of a full-length carte portrait, where the governing horizontal line is on a level with the camera. If a pictorial background, painted, in the usual way, with the horizontal line low in the picture, is now placed behind the sitter, the resulting photograph will be incongruous and offensive. It will be seen, on referring to fig. 2, that all the lines below the horizon must of necessity run up to it, no matter how high the horizontal line may be, for it is impossible to have two horizons in one picture; that is, a visible horizon in the landscape background, and an imaginary one for the figure, with the horizontal line of the background far below the head of the figure, and the head far up in the sky. The head of a human figure can only be seen so far above the horizontal line under certain conditions; such as being elevated above the observer by being mounted on horseback, standing on higher ground, or otherwise placed considerably above the base line, none of which conditions are present in a studio. Whenever the observed and observer are on the same level, as must be the case when a photographer is taking the portrait of a sitter in his studio, the head of the subject could not possibly be seen so high in the sky, if the lens included a natural background instead of a painted one. As, for convenience, the painted background is intended to take the place of a natural one, care should be taken that the linear and aerial perspectives should be as true to nature as possible, and in perfect harmony with the size of the figures. The lens registers, on the prepared plate, the relative proportions of natural objects as faithfully as the retina receives them through the eye, and if we wish to carry out the illusion of pictorial backgrounds correctly, we *must* have the linear construction of the picture, which is intended to represent nature, as true in every respect as nature is herself.

Fig. 2.



Aerial perspective has not been sufficiently attended to by the painters of pictorial backgrounds. There are many other subjects in connexion with art and photography that might be discussed with advantage—such as composition, arrangement of accessories, size, form, character, and fitness of the things employed; but I leave all these for another opportunity, or to some one more able to handle the subjects. For the present, I am content to point out those errors that arise from neglecting true perspective, and, while showing the cause, distinctively supply a remedy.

It is not the fault of perspective in the background, where the lines are not in harmony with each other—these too frequently occur, and are easily detected—but it is the error of painting a pictoral background as if it were an independent picture, without reference to the conditions under which it is to be used. The conditions of perspective are determined by the situation of the lens and the sitter. If the actual objects existed behind the sitter, and were photographed simultaneously with the sitter, the same laws of perspective would govern the two. What I urge is that, if, instead of the objects, a representation of them be put behind the sitter, that that representation be also a correct one. The laws of perspective teach how it may be made correctly, and the starting point is the position of the lens in relation to the sitter.

Some may say that these conditions of painting a background cannot be complied with, as the lens and sitter are never twice exactly in the same relation to each other. There is less force in this objection than at first appears. Each photographer uses the same lens for all his *carte* portraits—and pictorial backgrounds are very frequently used for these—and the height of his camera, as well as the distance from his sitter, are so nearly constant, that the small amount of error thus caused need not be recognized. If the errors that exist were not far more grave, there would be no necessity for this paper. Exceptional pictures should have corresponding backgrounds.

When a "sitter" is photographed standing in front of a pictorial background, the photograph will represent him either standing in a natural scene or before a badly-painted picture. Nobody should wittingly punish his sitter by doing the latter when he could do the former, and the first step to form the desirable illusion is pictorial truth. There is no reason why the backgrounds should not be painted truthfully and according to correct principles, for the one is as easy as the other. I daresay the reason is that artists have not intentionally done wrong—it would be too bad to suppose that—but they have treated the backgrounds as independent pictures, and it is for photographers to make what use of them they think proper. The real principles are, however, now stated, by which they can be painted so as to be more photographically useful, and artists and photographers have alike the key to pictorial truth.

In conclusion, I would humbly suggest to photographers the necessity of studying nature more carefully—to observe her in their walks abroad, to notice the gradual decrease of objects both in size and distinctness, to remember that their lens is to their camera what their eye is to themselves, to give as faithful a transcript of nature as they possibly can, to watch the flow of nature's lines, as well as natural light and shade, and, by a constant study and exhibition of truth and beauty in their works, make photography eventually the teacher of art, instead of art, as is now the case, being the reviler of photography.

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NATIONAL AND LOCAL PHOTOGRAPHIC PORTRAIT GALLERIES AND MUSEUMS.

BY LACHLAN MCLACHLAN.

On the 16th July, 1863, I made public a plan for the systematic collection and preservation of authenticated photographs of distinguished individuals, by the establishment of national and local galleries or museums under corporate or other authority and control.

I am happy to inform you that the Corporation of Manchester have adopted the suggestion, and that a committee has been formed for carrying it into immediate operation, in accordance with the resolutions annexed.

The value of the proposal has been so fully recognised by the press, and is so self-evident, that it is needless to enter into an explanation of its advantages; but it is desirable that the general principles upon which it is intended to carry it into operation should be made known.

In order that the utmost security may be given for the permanency of the portraits, the adoption of two methods is proposed. By the first the portraits would be transferred and enamelled by the process of M. Lafon de Camarsac, or by other similar methods; and as a guarantee of the authenticity, the corporate arms, with the signatures of the Mayor and Town Clerk, as well as the autograph of the individual, would be burnt on the reverse side. By the second method negatives or positives by transmitted light would be hermetically sealed by a process devised by Mr. Daniel Stone, chemist, of Manchester.

It is hoped that no urgent appeal need be made to photographers generally to induce them to assist in establishing, in a creditable manner, an institution which will secure such important results, which will at once throw a lustre upon their profession, and remain a monument of the great value of the art.

In soliciting contributions I beg to offer an observation as to the manner in which the greatest service can be rendered in furthering the project.

It is of the highest importance to secure the likeness of all distinguished persons whose portraits have been taken from the earliest days of photography, and by obtaining these the committee will be obliged in an especial degree.

In all cases the gift or loan of the negative will be desirable; but if that be objected to, a positive, by transmitted light, will be received. In this case it should be accompanied by an unmounted print from the negative.

It is very desirable that the portraits selected for enamelling should be uniform in size, the head to be $1\frac{1}{4}$ inch, filling an oval of $3\frac{1}{2}$ inches, and if a transparency be offered, these dimensions should be adhered to; but I need not say that the negative would be preferable. Every portrait will bear the name of the contributor; an official receipt will be given for the same, and lists published in the photographic journals periodically of all contributions received.

In transmitting negatives or transparencies, the names and designations of the sitters should be supplied.

All communications should be forwarded to me, and I shall be happy to afford any further information that may be required.—I am, your most obedient servant,

Lachlan McLachlan, Honorary Curator.

Cross Street, Manchester, 10th January, 1866.

(*Copy*).

City of Manchester.

At a meeting of the Photographic Museum Sub-Committee of the Council of this City, held on the third day of January, 1866, the Mayor in the chair, it was unanimously resolved,—That it is desirable at once to take steps for the formation of the Corporation Photographic Museum.

Resolved,—That Mr. Lachlan McLachlan be, and he is hereby authorised and empowered on behalf of this Corporation to make application to leading photographers for donations for the purpose of the Photographic Museum of negative or transparent portraits of distinguished individuals of this or foreign countries, upon the distinct understanding that the Corporation guarantee that any negatives or transparencies that may be liberally contributed shall not in any case be used for any private or trade purpose, but shall be systematically preserved, and used only with the express authority in writing of the Corporation for public purposes.

Resolved,—that the Town Clerk be authorised and requested to furnish Mr. McLachlan with a copy of the above resolutions.

(Truly extracted)

(Signed) Jos. Heron, Town Clerk.

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Proceedings of Societies.

South London Photographic Society.

The usual Monthly Meeting was held in the City of London College, on the evening of Thursday, January 11th, the Rev. F. F. Statham, A.M., F.G.S., President of the Society, in the chair.

The minutes of a preceding meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Mr. J. R. Johnson, Mr. A. Grant, and Mr. Beckett.

Mr. Wharton Simpson exhibited some examples of a recent improvement made by Mr. Woodbury in his photo-relief printing process, which enabled him to print them with a perfectly clean margin, the plate being cut off with a clean edge, and made of any shape, thus obviating the necessity of mounting, an important point in book illustration. He also exhibited some very fine examples of Mr. Swan's carbon printing. All the specimens were much admired.

Mr. Werge then read a paper on "Errors in Pictorial Backgrounds" (see p. 29). The paper was illustrated with diagrams on the black board, and by examples of card portraiture.

In proposing a vote of thanks to Mr. Werge, which was carried by acclamation, The Chairman remarked that the great difficulty in correcting these errors would arise from the fact that as the sizes and positions of persons varied so much, it would be difficult to avoid errors of perspective without a large assortment of backgrounds painted to suit every occasion. Another error grew out of the fact that they were generally distant scenes, but were immediately behind the sitter. He thought the painted backgrounds a great improvement on the hideous blank wall which used to do duty as a background. He suggested the importance, as a means of giving pictorial value to portraits, of occasionally taking them in costume, or at least surrounded by accessories which might suggest character and congenial occupation.

Mr. Blanchard, referring to the diagram, said he thought it scarcely did justice to the facts of the case, and that the placing of the horizon line low was admissible to give dignity to the portrait. Painters were in the habit of placing their sitters on an elevated platform, and thus, from making their own point of sight low, they lowered the horizon line in the picture, and gave dignity to the sitter. In point of fact, painters often introduced several points of sight in order to make their figures effective—in Raphael's cartoon of "Elymas the Sorcerer," for instance, to give effect to the picture and separate the figures; and his horizon line was often low, to give dignity to the figure.

Mr. Hughes thought that these remarks could have no bearing on photography, because the photographer could not make different points of sight. He was compelled to render literal truth. Art might take liberties with truth, but photography must adhere to simple truth as she is, and no question of licence could be entertained. Suppose a gentleman wished to have his portrait taken with his own house, or garden, or a certain landscape forming the background; and suppose, it being inconvenient to take the gentleman standing in this position, it were resolved to introduce a painting of this house or landscape as the background, to secure the proper effect, would it not be imperative that the horizon line in the painting should fall exactly on the place in the photograph which it would have done if the sitter had been photographed actually standing in front of the house or landscape? This being admitted, Mr. Werge's point was proved. He did not think there would be much trouble in securing this kind of truth, for as the position and height of the camera were rarely much altered, the backgrounds should be painted with reference to the normal height of the camera, and to the focus of the lens to be used. The conditions of photographic portraiture were pretty constant, and backgrounds should be painted to suit known conditions. The vanishing point in the background should be just opposite the camera; and if distant scenes were painted, let them be suggestive rather than sharp, so that aerial as well as linear perspective might be respected.

Mr. Howard agreed with Mr. Werge, that it should be an object to carry things out as true as possible to nature, and thought that real accessories in place of the badly-drawn imitations should be used. He thought a good deal might be said in favour of occasionally draping the sitter to break the angular hard lines of modern male costume.

Mr. Hughes thought these hard lines might often constitute individuality, and that they should not be concealed or altered.

Mr. Blanchard had not intended to defend the faulty backgrounds; but he thought that the position of the vanishing point was the smallest of these errors. He also thought, in reference to that, that the camera-stand was as a rule too high, and that it ought to be lower, so as to bring the camera lower.

Mr. Howard thought that Mr. Hughes would scarcely wish the great merit of photographs to be in their mechanical literalness, so that the chief point striking the observer should be the boots and coat of the period.

A conversation ensued on the difficulty of defining various different planes with the lens at the same time.

Mr. Blanchard said, as the human eye could only see one point at a time perfectly sharp, it became a question how much of a picture ought to be sharp; and since all could not be, it became imperative that the most important parts should be best defined.

The Chairman referred to the inevitable chair in photographic portraiture, so constantly prized, apparently, that it seemed to be the *chere ami* of every photographer and every sitter. He thought that might often be wisely dispensed with. He thought that much remained to be done in taking portraits of persons engaged in characteristic occupations and surrounded by characteristic accessories.

Mr. Cockin objected to the indiscriminate use of the word artist. These backgrounds were not painted by artists, nor were the photographers artists who would use such things.

Mr. Blanchard said that much blame was thrown on background makers for the vile things common: he believed the fault was rather due to photographers who insisted on having the hard sharp landscapes. The best backgrounds he ever knew were those of Mr. H. P. Robinson, who painted his own. There was one fine one with a portrait of Lord Elcho—by whom he forgot—but it was one of those suggestive backgrounds which Mr. Hughes had admired.

Mr. Simpson said he believed that portrait was by Mr. Lake Price, and the background designed by himself. Mr. Robinson painted his own backgrounds, because, having tried several of those making the highest artistic claims, he could not get what he wanted, and was compelled to do it himself. He feared that these abominable backgrounds were the legacy to photography of fourth-rate artists, and many of the errors condemned in them were only the perpetuation of a similar class of things to be found in portraiture by painters.

Mr. Dallmeyer, in answer to the Chairman, said that Mr. Werge was perfectly correct in his remarks on the question of perspective.

After some further conversation,

Mr. Werge thought that Mr. Blanchard had failed to see the object of the paper. In citing Raphael he had produced the strongest evidence of the truth of his (Mr. Werge's) remarks. Raphael's horizon line was always in the right place, and his figures suffered no loss of dignity on that account. Take the "Miraculous Draught of Fishes" as an example, in which the water-line was above the head of Christ. In the "Charge to Peter" the landscape was in its proper place; so also in "Paul Preaching at Athens." In all cases the horizon line was opposite the eye, and no loss of dignity was apparent in any of them.

Mr. Blanchard said he would not use the camera at the height of the head; he thought that the horizon line cutting the head would be most offensive.

Mr. Simpson said Mr. Blanchard seemed to forget that no one did use the camera so high. Even with standing figures the camera was not higher than the breast.

After some further conversation, in which it was pointed out that no horizon line need ever cut the picture, it was the position of the point of sight, irrespective of an actually drawn horizon, to which Mr. Werge referred, the subject dropped.

Mr. Dallmeyer then exhibited a number of exceedingly fine pictures taken with his new wide angle landscape lens, by Mr. D. W. Clark, Mr. England, and Mr. Wardley, which were much admired.

The New Periscopic Lens.

Mr. Dallmeyer then made a few remarks on the new periscopic lens, observing that as much interest had been felt in the matter, and no information was forthcoming, he had devoted a little time to working out the optical conditions necessary to the construction of such a lens, a statement of which might interest members. He said:—At a recent meeting of the Parent Society, pictures were exhibited taken by the new Steinheil periscopic lens, professing to embrace an angle of upwards of 100°. There was no appearance of distortion, but the general impression was that the pictures had been obtained by the use of a very small diaphragm. No information as to focal length and aperture of lenses was given; but having ascertained that the new lens consisted of two crown lenses only, I have devoted a few hours to the investigation of the case; and it may not be uninteresting to the members of this Society to be informed of the result. I may premise that the calculations refer to a crown glass, index of refraction for mean ray 1·52, when the resulting respective diameter, radii of curvature, and distance for a focal length of 10 inches are as follows:—

Diameter 1·5

$+r = 1{\cdot}72$
$-r = 2{\cdot}09$

Separation ·858

$-r' = 2{\cdot}09$
$+r' = 1{\cdot}72$

The largest useable aperture for the above arrangement, expressed in terms of focal length of lens, is $\frac{f}{40}$, which just sufficiently reduces the chromatic aberration for an approximate coincidence of the chemical and visual foci; and the angle included is from 100° to 103°.

In an article recently published in the *British Journal*, the author attempts to show (if I understand correctly) that a lens composed of two crown lenses can be made achromatic. This is evidently an error; for although as regards the excentrical pencils a compensation is effected, since the rays are made to cross the axis, yet this only reduces the chromatic fringes without affecting the non-achromaticity of the pencils as a whole. It is not my purpose to descant on the merits of a combination requiring as its largest aperture $\frac{f}{40}$. Suffice it to say that it is my conviction that lenses generally should not be used with so small a stop, if crisp and brilliant pictures are the aim of the photographer; and any person familiar with the laws of aberration from diffraction will, I am sure, bear me out in this assertion. Now, it may be stated as an axiom, that width of angle can only be secured at the expense of time of exposure—*i. e.*, reduction of size of aperture. Yet I have shown that the wide angle single combination recently introduced by me, and embracing an angle of above 90°, has for its smallest aperture $\frac{f}{35}$. This lens, for landscape purposes, I believe to be all that the photographer needs, as has been abundantly shown in the results obtained by Messrs. England, Gordon, Robinson, Good, Wardley, Clark, and many others, in most of whose pictures living objects have been introduced, proving the rapidity of the action of lens. For architectural purposes, where absolute freedom from distortion is of importance, I am of opinion that an angle of 60° is amply sufficient; and for this purpose, as well as for groups, copying and general work, I believe the triple achromatic lens, working with aperture of $\frac{f}{8}$ or $\frac{f}{10}$, is found to be the most generally useful instrument. Still there are occasions (and lenses generally may be regarded as tools) when the artist, for a particular purpose, requires an instrument which will embrace an angle of 100°, with freedom from distortion; and such an instrument has been requested of me for a particular subject in which the camera can only be placed in a certain definite spot. It was this request which induced me to investigate the nature and capabilities of a lens composed of two crown lenses only, and whilst so occupied I perceived the possibility of meeting the above requirement. I hope, then, shortly to bring before you a combination of lenses which includes as large an angle as the Steinheil lens; but instead of requiring an aperture $\frac{f}{40}$ will work with an aperture $\frac{f}{20}$, having therefore four times greater intensity or rapidity. I will only add, at present, that the expenditure of optical means—*i. e.*, cost—does not exceed that of the new Steinheil lens; it is free from distortion free from chromatic and spherical aberration, and includes an angle of upwards of 100°.

After some further conversation on the subject of lenses and the importance of a moderately large aperture and rapid exposure in securing the introduction of figures and other artistic effects, the subject dropped, and a vote of thanks to Mr. Dallymeyer was passsd.

It was then announced that at the February meeting, Mr. George Wallis, of the Art Department, South Kensington Museum, would give a lecture on "Art as Important to Photographers," illustrated by diagrams on the black board. The proceedings then terminated.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, January 17th, 1866.

At the Photographic Society's meeting of the 12th of January, the heliochromic pictures obtained by M. Poitevin with the help of the process I described in my last letter, were the objects of unanimous admiration. The author had brought a whole portfolio full of specimens, most of them not less than 40 centimetres by 30. They are in general reproductions of painted window-panes, and nothing can be more striking than the aspect presented by these images. The design is reproduced with all the perfection of ordinary photography, and, moreover, the colours of the original appear in all their variety. It is true that all the tones have not kept their exact value. Thus, the bright blues are attenuated, the reds are less crude, the blacks less vigorous; but all the colours—except green, we believe—are reproduced in astonishing harmony. Although these splendid natural paintings are not completely fixed, they yet support, to a certain extent, the action of diffused light, and may with impunity be exposed to a strong gas-light. These are but the first essays. Doubtless, M. Poitevin will not stop short at this result, which is already so striking; besides, this process for the preparation of the paper having been taken up commercially, other experimenters will endeavour to tread in his steps, and we shall not have to wait long for improvements.

M. Poitevin likewise exhibited some very curious pictures, reproducing medals by means of a transparent ink. Two years ago, taking for his starting-point the kind of photographic carbon-printing which proceeds by the mixture of the colouring matter with the bichromated gelatine, and in which the image is produced by means of a transparent ink, our friend thought to reproduce with similar ink the medals obtained by his helioplastic processes (described in 1855). The results recently obtained by Messrs. Woodbury and Swan led him to mention to the Society his analogous labours. The mode of operating is very simple. Five or six grammes of gelatine are dissolved in 100 grammes of water, and a sufficient quantity of colour or of Indian ink is added thereto. This mixture is poured lukewarm upon the medal or the photographic plate to be reproduced, the surface having been previously oiled. A sheet of wet paper is then applied, and pressed upon the medal with a counter-mould, and upon the photographic plate with a flat and somewhat elastic surface. It is left in the press till the gelatine has cooled into a jelly. The sheet of paper is now detached from the first mould; the light parts are hollow, and the demi-tints are formed by the absence of, or by thin layers of, coloured gelatine, the blacks being most in salience. All that now remains is to let the paper dry. The mould may serve indefinitely.

Mr. Fowler offered to the Society a developing solution formed with sulphate of iron and gelatine, and called attention to the advantages which English operators have found in it. The chief advantages, he says, are the avoiding of the grey precipitate which often forms with the ordinary solution of sulphate of iron, and the obtaining of images of great density, without recourse to after charging. He dwelt also upon the facility with which it may be spread upon the glass. The formula he gave was as follows:—Dissolve I gramme of gelatine in 5 cubic centimetres of pyroligneous. Keep this solution in a bottle. Make also the ordinary solution of sulphate of iron, and, instead of acetic acid, add thereto of the above-described solution I cubic centimetre per 5. This proportion may vary according to the condition of light, &c. There is no need of adding alcohol; the solution may be left on the cliché till the deepest shades are developed. Nitrate of silver may also be added to strengthen the image without fear of clouding it.

Mr. Fowler also placed before the Society some samples of Messrs. Anthony's porcelain paper. M. Frank remarked on this subject that some paper of the same nature had been sent to him from Spain, only the Spanish paper was glazed; the essays he had made with it had appeared to him very satisfactory.

M. Depaquis, the acquirer of M. Poitevin's first patent (carbon photography with bichromated gelatine), has communicated to me the following process which he employs to avoid transferring the image, which is first obtained upon glass: Take a glass employed for making gelatine (a very level glass, surrounded by a brim a centimetre broad), rub it with a rag impregnated with ox-gall, cover it with a very thin layer of sensitive mixture (bichromated gelatine) prepared for charcoal photography, and then let it dry spontaneously away from the light. The mixture being, coat it with strongly alcoholized normal collodion, containing 2 per cent. of cotton. A quarter of an hour after, when the collodion is dry, cut the film all round the border with the point of a penknife, and raise is by one corner. The sensitized film is then removed, and placed with the collodionized side against the cliché; then wash with warm water after exposure, in order to dissolve the parts that have not been acted upon. You will thus more easily obtain pictures similar to those which are obtained on glass and then detached.

Mr. Smith, a German amateur, has forwarded to the Photographic Society a series of charming views, which he has obtained with M. Sebatier Blot's open air apparatus. The pictures are perfect in execution, and call to mind the pretty views produced by the English landscape photographers.

I have received from Mr. Swan a very graceful gift—two charcoal photographs, surpassing anything I have yet seen of the kind, and which have also the merit of being charming pictures, so artistically has the subject been chosen. I will not add more, for you know as well as I to what perfection Mr. Swan has attained in carbon photography. I have thought that you would allow me to express to him through your columns my gratitude for the pleasure he has given me by forwarding the two photographs—bijous which I have placed amongst the most precious objects in my collection. Ernest Lacan.

PHOTOGRAPHY IN GERMANY.

Berlin, January 1st, 1866.

In my last letter I wrote to you of the periscope lens by Steinheil, a compound of two non-achromatic crown-glass lenses, and of the magnificent pictures it was expected to give. I am sorry to have to say that the prints from negatives recently taken by this lens do not correspond to the expectations we had of them. I myself have endeavoured, without success, to obtain one of the lenses; up to the present time, notwithstanding renewed requests, I have not even seen, much less tried one.

The pantascopic lens of M. Busch induces greater hopes of success. This lens, which is similar to the globe lens, but consists only of two thin achromatic meniscus lenses, has been shown by M. Busch at the Berlin Photographic Society, and my friend Remelé has taken recently by it three wonderful pictures, whose angle of view is 95°; the circle of illumination is 110°. The images are without the least inaccuracy, and quite sharp up to the margin. I send you a proof of it—a view of our Exchange—and I have noted upon it the broadness of an image taken with an ordinary landscape lens and with Dallmeyer triplet from the same stand-point. I believe that this lens is by all means to be preferred to the new pantascopic camera of Johnson, at least for architectural views.

A short time before I became accurately acquainted with the working of the pantascopic camera, I was in Switzerland, and there met the eminent landscape photographer Braun, of Dornach. He takes views with the pantascopic camera, and there is no doubt that this camera is quite wonderful for landscapes; but the views taken by it have the fault of false perspectives, and the thence following incurvation of the horizontal lines. This is very detrimental to views of architecture. It is less important for landscapes; but here, also, if the apparatus is working in a narrow valley, this narrow valley appears on the image as widening itself to the foreground. The cause is that the image is not, as in ordinary views, projected on a plane, but on the envelope of a cylinder.

M. Schuller, of Schässburg, has, besides, constructed a pantascopic camera, which can be used with lenses of different focal distances, by all means a great advantage over that of Johnson, which is only constructed for one single lens.

The gelatino-iron developer, which is so much spoken of in England, has recently been the object of a series of researches I have made myself.

I first was much ravished at its results, when I made use of Hughes's developer; it seemed to work more densely and softly. Afterwards I essayed the modifications of Cooper and Cherrill, and got less favourable results. This induced me to undertake a series of comparative experiments with different gelatine developers and the ordinary iron developer; and I found then that the ordinary iron developer is to be preferred on many occasions for portraiture, as working more softly; but the gelatine developer is to be preferred for reproductions and other cases where contrast is required. I give the results in another paper.

On this occasion I also made some renewed experiments on the sensibility of the iodized collodion, compared with the bromo-iodized collodion. I took a view from a plaster bust hung with black drapery. The two collodions were composed as follows:—

0·3 Na Br	0·4 Na I
0·4 Na I	1·0 Cd I
1·0 Cd I	30 alcohol
30 alcohol	20 plain collodion
20 plain collodion	

Developer the same for both.

Sulphate of iron	3 parts
Acetic acid	3 ,,
Water	100 ,,

The results were most surprising. The bright lights became on the iodized collodion more intense than on the bromo-iodized collodion, but the black drapery appeared on the bromo-iodized collodion much more perfect than on the first. It would hence follow that the iodized collodion is more sensitive for very bright light, and the bromo-iodized collodion for weak light. Therefore the latter gives such fine half-tones and details in the dark parts. Besides, the iodized collodion shows the well-known fault that the lines do not appear clearly defined, but with blurred edges.

I don't know if there have been made already in England experiments with magnesium light in the positive printing process. The desperately bad weather during the last weeks induced me to try it, and I produced some good carbon prints with magnesium light. I made the attempt before the Photographic Society, and used Joubert's process modified by Leth (*vide* my last letter).

A solution of gum arabic and chromate of potash was poured on a glass plate, and this exposed under a positive to the magnesium light, burning in a lamp by Brothers, with parabolic reflector. When 4½ feet (=1·3 grammes) of magnesium wire were burnt, I covered the chromate film with carbon powder, and thus got a well-detailed image, which I washed, removed, and transferred to paper. This method, I believe, is the most easy of all carbon printing processes, and that extraordinarily fine pictures are got by it is testified by Obernetter's and Leth's enamels, prepared in the same manner.

The recent researches by Carey Lea on development after fixing are most interesting. They show what a great influence the organic substances have in the collodion, and confirm afresh Hardwich's experiences (*vide* his Manual of Chemistry). I expressly called to mind the effect of these substances when I published my work on the sensibility of iodide of silver, in the Photographic News, and enforced especially the influence they are able to exercise on the sensibility of iodide of silver produced with excess of iodide of potassium, observed by Lea. These observations have been quoted as objections to my theory. Now it seems to me that it is very possible to regard them from quite another point of view.

I have recently produced, in a very simple manner, a yellow, non-actinic paper, which does excellent good service. It has always seemed remarkable to me, that of all sorts of yellows, the chromate of lead had the least actinic power. I therefore prepared some paper, by immersing it, first in chromate of potash (saturated solution), and then in nitrate of lead solution, 48 grains per ounce.

I thus got a yellow paper, under which a sensitized collodion plate, five minutes exposed to sunlight, was not affected at all.

I herewith send you a piece of this paper, which changes its colour within the light only very little.

I will conclude by communicating a little improvement which I have added to my stereoscopic camera (from Mr. Dallmeyer). As you know, it is necessary to remove the two lenses, in order to take out the front with the stereoscopic lenses. This is disagreeable, and occasions loss of time. I therefore have sawn off the one edge which slides in the groove on the right hand side of the movable front, and thus it is not held in the groove, but only laid on its cell in front of the camera, and on one side clinched by a screw and a small turn-button. On the left side it is held by the groove as usual.—Yours truly, Dr. H. Vogel.

[The convenient arrangement for the movable front of the camera ought to be used in all cases where a pair of double combination lenses are employed with the stereoscopic camera. Mr. Meagher applied it to the stereoscopic camera we have in use, some years ago.—Ed.]

SIR J. HERSCHEL'S CIPHER.

Sir,—I am sorry to say Dr. Phipson has failed in reading my cipher. He probably took it for granted that it had reference to the subject under discussion, whereas the reading is this :—

Sing, Celestial Muse, the destroying
wrath of Achilles,
Peleus' son, what myriad woes it heaped
on the Grecians,
Many a valiant hero's soul
dismissing to Hades.

No common ingenuity must have been exercised on Dr. Phipson's part, however, to have picked out a series of words forming so coherent and appropriate a sentence, agreeing precisely in the numbers of letters which go to form them with those of the cipher, of which, it need not be observed, a great many letters are (as is not uncommon in ciphering) supernumerary.—Yours, &c., J. F. W. Herschel.

Collingwood, January 16, 1866.

◆

Photographic Notes and Queries.

Chloride of Silver in Gelatine.

Sir,—A foot-note to your leader of December 29, on "Gelatino-Chloride of Silver," calls from me a few remarks. Mr. Palmer, of Stonehouse, more than two years ago communicated to me his process of chloride of silver suspended in a solution of gelatine, for enlargements on canvas. He then showed me a specimen of his work, an enlargement to life-size, portrait of a lady. I was surprised to find the organic and the inorganic elements agree so well.

The surface on which Mr. Palmer then worked was not "a coating of albumen," though, about six months after, he again showed me a specimen, albumen being the substratum. This specimen was a fine one, though I do not believe it arose from the albumen coating, but from a more perfect manipulation.

While on this subject, permit me to say it is difficult to understand a dried, perhaps coagulated, coating of albumen acting chemically on gelatine to render it less soluble, as you state (unless I misunderstand you). I can understand the mechanical union between albumen and gelatine being much greater than would exist between gelatine and the plain surface of paper or canvas, thus preventing the water entering between the two surfaces.

In your leader you say, "for printing on opal glass the same preparation is used, and the plate requires no preliminary coating"—thus showing that albumen is not really required when a suitable surface of any other kind can be produced.

Begging a corner in your valuable journal, I am, sir, your obedient servant, P. Service.

Plymouth, January 9th, 1866.

◆

Talk in the Studio.

The Advance of Wages Movement among Camera-Makers.—We have received from Mr. H. R. Worth, on behalf of the committee, a letter stating that no mention whatever had been made at the meeting of a "strike" as a means of enforcing their wishes. We are very glad to learn this, and hope that whatever the issue, it may be, as they desire, "an amicable adjustment" of the matter. Mr. Worth also states that we have been misinformed as to their wages, which are not better than those of other cabinet makers, "considering the class of work expected of them." We fear the last sentence explains the whole; if they receive 15 per cent. more wages for working the same number of hours, they are better paid. The quality of the work would only influence the question of piece work, not of time work.

Mechanical Power from Sunshine.—M. Babinet has recently communicated to the Academy of Sciences an account of some experiments by M. Mouchot, Professor of Mathematics at Alencon, on the mechanical effects produced by confined air heated by the rays of the sun. In these experiments M. Mouchot employed a cylindrical vessel of thin silver, blackened on the outside, and inclosed within two cylinders of glass, placed one inside the other. The office of the glass cylinders, of course, was to prevent the heat which might pass through them to the blackened silver cylinder being radiated back again—glass, while affording a free passage to the direct rays of the sun, being practically opaque to radiant heat. The silver cylinder was half filled with water, and an air-tight cover was then fitted on it; a tube, fitted with a stop-cock, passing vertically through this cover to very nearly the bottom of the vessel. Thus arranged, the apparatus was placed in the sun, whereupon the air in the upper part of the vessel speedily became heated sufficiently to cause it to exert so much pressure on the water under it that the latter, on the stop-cock in the tube passing through the cover of the vessel being opened, escaped in a jet more than ten meters high. This very remarkable result led M. Mouchot to construct an apparatus on the same plan, which yielded a continuous jet of water as long as the sun was shining on it. M. Babinet is of the opinion that machines on this principle might be found useful for raising water on the great scale in tropical count ies

Gelatine in the Printing Bath.—Mr. Palmer writes to us: "Do impress upon your readers the importance of making the paper horn dry before fuming and after fuming. If kept perfectly dry it will keep six days."

Ancient Portrait.—Mr. Charles Egan, of Leamington, has sent us an interesting copy of an old portrait of the fifteenth century, painted by Jan de Mabuse, the subject being Prince Arthur, son of Henry VII. The painting appears to be on panel, and is characterized by the style of drawing well known in Holbein's portraits. This is one of the valuable purposes to which photography can be put, and which we are always glad to see.

Blisters in Albumenized Paper.—A correspondent says:—"I have been in the habit of floating my albumenized paper upon a 70-grain silver bath for from four to five minutes at night. Next morning they generally had a yellowish or creamy tinge; printed well, toned slowly, and blistered awfully as soon as put into the hypo, the marks of the blisters showing darker than the rest when finished. I now float on a bath of the same strength for seven minutes, and the paper keeps quite white, tones quicker, and the blisters have disappeared."

GELATINO-CHLORIDE OF SILVER.—Mr. W. H. Smith, whose patented method of printing on wood, &c., we recently noticed, has sent us an example of printing by gelatino-chloride of silver on paper, which is exceedingly fine. The colour is rich, and the print delicate and transparent, but without gloss, the surface being that rather of a fine, highly rolled plain paper. Some samples of prepared paper which accompanied the print we have not yet had weather and time to test.

THE LATE FINE ART COPYRIGHT CASE.—In this case, "Graves *v.* Ashford," recently decided for the plaintiff, with certain points reserved, Mr. Coleridge, Q.C., moved for a rule to enter a verdict for the defendant. The first point was, that copying plates by photography was not an infringement of copyright within the meaning of the statute of Geo. II. This Court had decided otherwise in the case of "Gambart *v.* Ball," but it was intended to review their judgment upon appeal. Another count was that the publication line on the plates simply said "Published by Henry Graves and Co.," and did not state the names of the proprietors as required by the Act; and further, that the name of a gentleman who appeared upon the evidence to have some interest in the plaintiff's business was not mentioned. These circumstances, it was contended, precluded the plaintiff from acquiring copyright. As to "The Highland Nurses" there were other objections,—that there has been an alteration of the publication line after the artist's proofs had been printed; that the photograph sold was not made from a plate, but from another photograph which had been previously made by another photographer; and lastly, that the photograph which the plaintiff had bought of Mrs. Jackson had been sold to her by the defendant more than six months before action. The statute said that the action must be within six months after the infringement. The Lord Chief Justice said that as to "The Highland Nurses," the rule would be granted upon all points which referred only to that picture. As to the other two pictures there would be no rule. Upon the question whether copyright in plates could be infringed by photography, the rule was refused, with the intention of the judgment in "Gambart *v.* Ball" being reviewed. As to the publication line, they thought that the statement that the plate was published by Mr. Graves meant that he was proprietor of the copyright. Publication might, indeed, be separate from proprietorship, but in the ordinary understanding of the term a party who published exercised an act of ownership. As to the remaining point, they did not think that the evidence showed that any other person than Mr. Graves was a part proprietor. Rule accordingly.

ARTISTIC COPYRIGHT IN FRANCE.—The laws of France, and the spirit in which they have been administered, especially during the last few years, are highly favourable to rights of property in works of art; and, at the same time, the infringements of those laws are more frequent than would be expected under the circumstances. The case of a complaint brought by M. Salvatore Marchi, of Paris, a producer of statuettes and other art objects, against M. Laurent d'Alfonso, of Bordeaux, a dealer in such works, offers some points of interest. It appeared that the defendant had purchased pirated copies of the plaintiff's productions, and that some of them had been seized in his possession. The defendant was not proved to have been the producer of the illicit copies, and the court of Reole acquitted him, but ordered the confiscation of the copies seized. M. Marchi appealed to the Imperial Court of Bordeaux, which reversed the decision of the lower court. It was decreed that the defendant, by his knowledge of the class of works referred to—religious art—in consequence of former dealings with the appellant, and, probably, by the receipt of catalogues and lists published by the latter, could not be ignorant of the fact that the images which he had sold in large quantities to the dealers of Verdelais were illicit copies of the appellant's productions; and the fineness of their execution must have told him that they could not have been the work of the Italian modellers, of whom he declared he had purchased them, but must have been produced by more able hands; the Imperial Court, therefore, declared him to have been guilty of selling and offering for sale pirated works, to the injury of the appellant, and condemned him to pay a fine of 200f., 500f. damages, and all expenses.—*Journal of Society of Arts.*

TASTE IN MATTERS OF ART.—"Wherever the word 'taste' is used with respect to matters of art, it indicates either that the thing spoken of belongs to some inferior class of objects, or that the person speaking has a false conception of its nature."—RUSKIN

To Correspondents.

*** With the PHOTOGRAPHIC NEWS for January 26th will be presented the promised picture by Mr. Woodbury's Photo-Relief Process. We may here suggest to agents the importance with that number to fold the paper into three lengthwise, to prevent crushing the picture.

STEREOSCOPIC.—Such a long camera as you describe will answer for enlarging. 2. Much difference of opinion prevails as to whether the transparency should be enlarged or not: some operators use the transparency the same size as the original; some a little enlarged; and some enlarged beyond the size of the intended negative, which is reduced from the transparency. Mr. Blanchard uses this plan; you will find his remarks on it in our YEAR-BOOK for 1865. 3. A condenser is not necessary; the best enlarging lens is the No. 1 triple, but a good ¼-plate or ½-plate portrait lens will answer. 4. We generally use one grain of iodine and two grains of iodide of potassium in an ounce of water. 5. We have no doubt that Mr. Dallmeyer will examine and verify a second-hand lens purporting to be of his make.

AMATEUR X.—We have not met with such a result, which ought not to occur. When the trouble is present, frequent filtration seems to be the only remedy. The positive character of the image may proceed from under-exposure, or possibly from excess of the gelatine preparation. 2. The only remedy for a negative varnish which is sticky when dry, is to abandon its use.

A BEGINNER.—On the whole, No. 4, and next to that No. 3. The former will require a somewhat longer room for card pictures, being a little longer in focus.

THOMAS WILLIAMS.—We cannot tell you where you can purchase a condenser, nor the price. Possibly Mr. Atkinson, of Liverpool, the maker of solar cameras, will supply you.

J. E. HOOKER.—The form of glass house with the sloping sky-light in front of the sitter is not found successful in practice. The best form is the ordinary oblong room with ridge roof. Nevertheless, by skilful management of blinds, such a room as you have sketched might answer pretty well. You will find a good deal of information on the subject in our last two or three YEAR-BOOKS. We regret that our engagements do not permit us to write private letters on these subjects.

KELT.—We do not know that any London agency has yet been established for Parkesine manufactures. Mr. Parkes' address is Birmingham.

J. P. C.—We fear that with the limited facilities for lighting which you possess, anything like satisfactory portraiture will be difficult, if not impossible. The only plan to improve the result will be to shut off more of the top-light and prolong the exposure. With a south light the shadows in the background are almost inevitable. We have no idea what your "triple quarter-plate" lenses are like, and therefore cannot state whether they are suitable for instantaneous work; but you will quickly ascertain by trying. Your negatives are evidently very much over-intensified.

SCARBORO'.—By application to Mr. Parkes, at Birmingham.

NIL DESPERANDUM.—If you have described your operations accurately, the cause of error is plain. You developed your dry plate with a 3-grain pyro-solution, containing twenty-four minims of acetic acid, but you added no nitrate of silver! This is a common error with persons accustomed to work the wet process when they attempt dry plates for the first time. Try again as before, but add a few drops of a fresh 15-grain solution of nitrate of silver.

A LOVER OF PHOTOGRAPHY.—It is probable that an increase in the strength of the iron solution will meet your case. A trifle longer exposure would have improved the portraits sent. Thanks for your good opinion about the YEAR-BOOK.

A LADY PHOTOGRAPHER.—Your lighting is a little too directly from the front. If you place your sitter on a platform, you must also elevate your camera, or you will obtain a disagreeable view of the face. No. 1 is the best of the cards enclosed. Nos. 2 and 3 are a little over-intensified. 2. The best plan to obtain what you require is to purchase published cards by good men. We have no means of judging of the trustworthiness of those to which you refer.

VERITAS.—The specimens are very good indeed for a beginner. No. 6 is better than No. 1. The precipitate is doubtless a portion of the gelatine.

G. A. B.—The number of pieces of wire gauze is not important, so long as the portion is filled; the exact fineness is not important, but it should be fine. The pieces are pressed in like gun wads; the object is to prevent a possible return of the flame so as to come into direct contact with the gas. 2. Your equipment will answer very well. If your transparencies are to be produced by camera printing, the stereo negatives will be all the better. for being a little larger than the transparency. The only point of importance in taking negatives for producing transparencies is to take care that they are full of detail, and not too intense.

BLANCHE.—The card Blanche enclosed is very good indeed. The pose, lighting, and arrangement are good, and the picture is delicate and brilliant We shall be glad to see more of such work.

W. J. MARQUANT.—The fact you mention is an interesting one, and we will note it. The lens scarcely covers sufficiently for card work.

CHARLES EGAN.—Thanks for the interesting copy of Mabuse's portrait of Prince Arthur. Our notices of photographs registered are simply those registered by our publisher, and the notices are acknowledgments of the fact.

Received: "PHOTOGRAPHIC MOSAICS."

SIR JOSCELYN COGHILL in our next.

Several Correspondents in our next.

Several Articles in type are compelled to stand over until our next.

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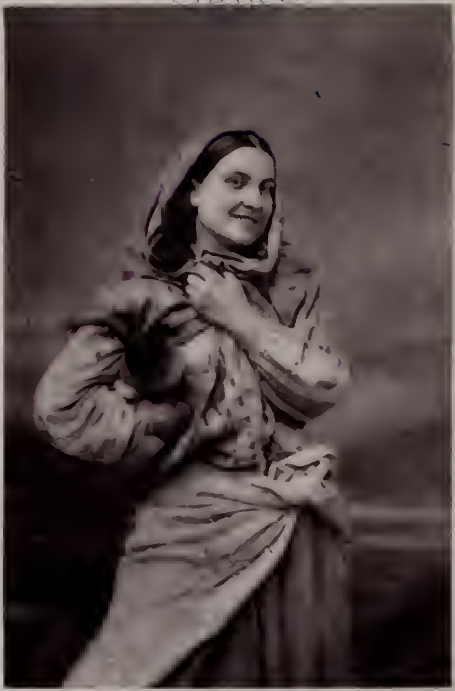

A MOUNTAIN-DEW GIRL KILLARNEY

Printed by Woodbury's Patent Photo Relief Process *From an Original Negative by H. P. Robinson*

PRESENTED WITH THE PHOTOGRAPHIC NEWS, JANUARY 26, 1866.

THE PHOTOGRAPHIC NEWS.

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OUR PRESENTATION PRINT.—WOODBURY'S PROCESS.

We present our readers this week with the first issued example of a process by which photographic half-tone can be secured by mechanical printing. Our readers are already familiar with the details of this mode of printing, and what constitutes the *differentia* between it and other established methods. Nevertheless it may be desirable briefly to recapitulate a few of the facts in calling attention to this print.

In all the ordinary methods of mechanical printing, gradation from light to dark is obtained by the use of lines or dots, which, having finer or broader surfaces, and being ranged in close proximity or spread wide apart, the spaces between being absolutely white, give the effect of the lightest tints or the deepest shades. This is the case whether the ink be applied to the portions in relief of a woodcut, to the hollows of a copper-plate, or to the portions of a flat surface for which it has affinity on a lithographic stone. The ink is, in each instance, opaque, and gradation is only obtained by breaking its continuity of surface with small spaces of white. In photographic printing, gradation is obtained by different depths of a continuous tint, resembling in effect successive washes of a transparent pigment in water-colour painting. The difficulty of reproducing this by mechanical means has been the obstacle in all attempts at photo-engraving, photo-lithography, or photo-block printing, and it has been for some time past admitted that the only means of success in this direction would consist in a method of translating the half-tone of gradation of tint into the half-tone of grain or stipple.

In Mr. Woodbury's photo-relief printing the end is secured without any such translation: the picture is produced with every gradation of a continuous tint, and by mechanical printing sufficiently rapid to compete with copper-plate or lithography. To do this, however, it has been necessary to introduce a distinctly new principle into printing operations, and to prepare a plate, which should apply or give up to the paper, different proportions, in different parts, of a semi-transparent ink, according to the depth of tint required by different portions of the picture. This is the problem which Mr. Woodbury has solved, and we may remark, in passing, that we see no reason why the same principle might not find valuable application in the ordinary process of printing from engraved intaglio plates.

Mr. Woodbury's photographic intaglio is very simply obtained. The image in relief having been produced by the action of light through a negative on a film of bichromated gelatine, this gelatine relief becomes the matrix from which an indefinite number of metal plates, in intaglio, may be produced. The metal used resembles type-metal. A plate of this metal, about a quarter of an inch thick, with a perfectly plane surface, is placed in contact with the gelatine relief, and subjected to hydraulic pressure, by which a perfect transcript of every gradation in the gelatine is produced on the metal. Notwithstanding the softness of the metal, but slight trace of wear or deterioration is observed after some thousands of impressions have been taken from a plate. If the plate needed to be cleaned for each impression, like the copper-plate, or if it were necessary to submit it, in printing, to a heavy or rolling pressure, it would doubtless be necessary to subject it to some hardening process; but the pressure being light and steady, this is not necessary. The process, moreover, of producing a new plate from the gelatine relief is just as simple and easy as producing a print on paper.

The method of printing is easier than any other with which we are familiar. In the various modes of photographic printing—except the collodio-chloride—several operations are necessary to render the paper sensitive to light; and several others are required to tone and fix the image when obtained. In the various mechanical printing processes some skill and care are requisite to keep the ink properly distributed on the roller, and to transfer it from the roller evenly to the surface of the plate or stone. But in the new method of printing, a little of the ink—which consists of a warm solution of gelatine and lamp-black, with a little crimson lake—is poured on the surface of the plate, where it stands in a little pool in the centre: upon this the paper is placed; the platin is brought down, giving the slight pressure necessary, which at once spreads the ink over the surface and drives off at the edges all that is not required to form the picture. In a few seconds the gelatine has congealed, and the paper, being lifted up, brings with it all the ink from the depressions on the plate. The printing is indeed rather a process of casting than of printing as ordinarily understood, and the picture is a relievo in coloured gelatine, taken from a very shallow metal intaglio. As the gelatine dries, it of course contracts, and the finished picture shows very little effect of relief or impasto. As the colouring matter is carbon, the permanency of the pictures is tolerably certain.

If the picture were left in this state it would be readily liable to injury from moisture, although not more so than a water-colour drawing, which is not usually regarded as a very unstable form of art. But it will be obvious that there are various modes of rendering a film of gelatine insoluble. Mr. Woodbury has, during the last few months, tried several of these, but has not found any so simple and effective as immersing the print in a solution of strong alum. This at once renders the film insoluble; and, when dried, it is impervious to moisture, and little liable to mechanical injury.

The possible rate of printing remains yet to be absolutely determined. With the mechanical appliances improvised for experiment, and the amount of manual skill obtained in the prosecution of experiments, Mr. Woodbury has been enabled to produce, single-handed, one hundred and twenty prints in an hour. In the production of several thousands required for our readers, all the experience and skill necessary in the successful working of any process had to be acquired, and the last two or three thousand are not only better in quality, but have been produced with more ease than the first two or three thousand. In each day's work with one pair of hands there are necessarily many interruptions, in preparing fresh ink and paper, clearing away accumulated prints, &c., but we find the smallest number produced in a day's work of six hours and a half to have been 403 prints, and the largest number in the same time 560 prints. With a little practice and a larger number of presses at work, which might easily be managed, we see no reason why the rate of production should not be at the least doubled.

The same uncertainty as to the minimum cost must at present exist. The prints we present to our readers cost, without mounting, as nearly as possible one-fifth of a penny each for materials, namely, ink and paper. The cost of the latter is, however, exceptionally high, being charged at the rate of £7 per ream of demy. This is due to the necessity of preparing it so as to secure the most perfect surface possible, an operation which would be much less costly on a commercial scale than on an experimental scale. The amount of gelatine used in printing a thousand prints is just a half of a pound, and costs two shillings. The colouring matter for each thousand costs about one shilling and tenpence.

Since these were commenced, Mr. Woodbury has discovered a method of effecting an improvement which, for book illustration especially, will be an enormous advantage; we refer to printing the pictures with a clean margin, olaving the print of any shape, and so dispensing with the necessity of mounting. Of the excellence already obtained our readers will form their own opinions; but as, in the first experiment of printing a large number of a new process, in which all the experience was to be gained—no other process with even any analogy to this, as a guide, having any existence—it is certain that some variety in the excellence of impressions must exist, and a due allowance for the circumstances must therefore be made; but we may remark that we have seen impressions from the same plates in no wise inferior to silver prints, and we see no reason to doubt that, after a little further experience has been gained, impressions may with certainty be produced equal in all respects to carbon prints, of which these prints are the analogue.

The subject—"A Mountain-Dew Girl: Killarney," photographed from life by Mr. H. P. Robinson, who kindly lent the negative for the occasion—was selected for the double purpose of presenting our readers with a pleasing picture, and forming a crucial test for the process, which is necessarily much more severely tried with a figure subject, abounding in the gradation familiar to portraitists, than by a subject chosen to suit the process.

We have in our remarks referred to Mr. Woodbury only, as we do not intend in this article to enter into detail on disputed points. We have repeatedly, as our readers know, referred to Mr. Swan's claims as an independent and prior inventor, claims which he, unfortunately for himself, rendered nugatory by preserving the matter a secret until after Mr. Woodbury had secured his patent. We are interested to observe that M. Poitevin, a name so much honoured in connection with helioplastic discovery, has been for some time working in the same direction, but has not, as he states, until now made public mention of the matter, and he does it now rather to congratulate other successful workers than to invalidate the claims already recognized. But there is another class of claims of a very indefinite character, which always arise when a successful discovery is made, and which we especially deprecate. These claims generally assume the form of a loose remark to the effect that some one "did that years ago, but abandoned it." We do not stop to ask for the evidences of such claims' but simply remark that to have made an important discovery and abandoned it, is suggestive of an amount of folly or criminality which the claimant should be ashamed to avow, and places him in the position

"————of one whose hand,
Like the base Indian, threw a pearl away
Richer than all his tribe."

To Mr. Woodbury, we believe, is legitimately due all the honour and profit of an independent discovery of which the origination is scarcely the greatest part, but which, through a thousand nameless details and mechanical difficulties, he has pushed, with unflagging energy and enterprise during the last year and a half, to a successful issue. In the hands of one with less ability, or less opportunity to devote himself to the working out of the matter, so complete a success could scarcely have been achieved. We are glad to say that the patent will probably be acquired by a company, who will, we believe, issue licences liberally, and thus give facility for the wide and useful application of one of the most important developments of our art.

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THE NEW ORGANICO-IRON DEVELOPER.

THE singular discrepancy of opinion elicited at the last meeting of the Photographic Society, and which has been expressed at other meetings, as to the merits of the new organico-iron developer, appears to prevail on the other side of the Atlantic. An absolute decision on the subject can only be obtained by careful practice and comparison of results. During the progress of the experiments which many photographers are doubtless making, it will be interesting to learn the results of able men in the United States and on the Continent of Europe. Two articles on the subject will be found in our columns this week, one by Mr. Wenderoth, a very skilful photographer in Philadelphia, from whose hands we have seen excellent results in various branches of photography; and one by Dr. Vogel, of the Berlin University. Both these gentlemen find that prolonged exposure is necessary to produce good results with the new developer. To prevent any doubt as to the preparation of the developer, Mr. Wenderoth has worked with some prepared by Mr. Carey Lea himself, the originator of the new agent. Exhibiting some results at a meeting of the Philadelphia Photographic Society, he observed that the negatives obtained by the developer were good, but altogether too slow for the professional operator; some developed by a solution prepared after Mr. Cooper's formula were "good for nothing at all;" and the third, by the ordinary iron developer, were not only produced quicker, but were best of all. Mr. Coleman Sellers, who presided, stated his experience to be similar to that of Mr. Wenderoth. Other communications were, however, made to the meeting of a directly opposite tendency. Dr. Vogel, it will be seen, finds that a prolonged exposure is required to secure an amount of detail obtained in a shorter exposure with the ordinary developer. Mr. Lea suggests that in the hands of his American friends too large a proportion of the restraining agency has been added to the developer. This appears very likely to be the case. It is clear that in Mr. Wenderoth's hands the peculiar qualities possessed by the organic developer were not required; he was obtaining sufficient cleanliness and intensity by the ordinary developer; the change in his hands, therefore, must certainly be for the worse. To persons in his position we simply re-echo Mr. Hughes's advice: Don't use gelatine in the developer. Our own conviction remains that there are many cases in which, properly used, the new developer confers a decided advantage; but as certainly as that which is medicine to the sick may be poison to the healthy, so certainly will the application of that which may be an aid to the photographer struggling with certain difficulties be a bane to those already possessing the conditions of successful working.

RETURN OF SPECIMENS FROM EXHIBITIONS.

We have received from our esteemed friend, Sir Joscelyn Coghill, an explanatory letter regarding the return of specimens contributed by photographers to the late International Exhibition at Dublin, in which he points out that, as Director of the Photographic Department, he entrusted the duty of returning contributions to their expectant owners to an efficient staff of persons, and that, so far as it was possible, dispatch was used in the necessarily slow process of collecting together, repacking, and returning the pictures. We feel certain that no one who knows anything of the indefatigable energy, and the more than courtesy—the cordial kindness of feeling—which Sir Joscelyn devoted to the discharge of the honorary and onerous duties which he had undertaken, could for one moment entertain the notion that any neglect on his part delayed the return of their pictures. Most persons, looking at the matter in the light of the explanation afforded, will readily admit that a month or six weeks was not a long time to complete all the arrangements necessary for the return of such a large collection of contributions. But, unfortunately, contributors, whilst they are apt to overlook these things, have also some unwholesome recollections of neglect in connection with exhibitions generally. We have unfortunately been the recipient of many complaints from many persons of the difficulty, damage, and cost connected with the return of specimens from exhibitions in London, the provinces, and the Continent. We have known cases in which years have elapsed before specimens have been recovered which had been sent to Paris exhibitions. Mr. Rejlander has often told us of a fact in reference to a collection of specimens sent to a Birmingham exhibition, for which the jurors awarded him a medal. Neither specimens nor medal have to this day reached his hand, although years have elapsed since. Added to these general traditions, was the fact that some delay at least appeared to exist; that in some instances—that of the "Old Photographer" for one—letters addressed to the General Secretary, making enquiry on the subject, met with no reply; but that about the time an application was received from a trading firm, asking permission to appropriate the specimens as aids to the sale of copies of which they were willing to undertake the agency. Added also to these traditions of irregularity in returning specimens at former exhibitions, was the existence of a rumour that the owners of the exhibition building at Dublin were very anxious to retain all good pictures, &c., which they could, to form the nucleus of a permanent gallery. Remembering all these things, it will not, we think, be regarded as very strange that some contributors who valued their work should begin to get anxious, and incur a heavy personal expense in securing the return of their specimens.

We fear that the fact is too certain that contributors and committees are frequently too careless at the commencement of an exhibition as to the inevitable duties attending the close. Exhibitors are frequently exceedingly negligent in not attaching their names very legibly to the back of the pictures, and also to their cases. Amateur committees, who work with zeal in arranging and opening an exhibition, have generally become heartily sick of what is generally a thankless duty long before its close, and leave the duty of returning contributions to some paid agent, who gets through it or not, as it may happen. We speak from personal knowledge, having been on many exhibition committees; and we feel convinced that nothing short of rigid system, and absolute attention to this system on the part of contributors as well as managers, can ever secure the satisfactory achievement of the final duty of return of specimens. If it were imperative that every box should contain not only the owner's name and address, but also an inventory of its contents, attached to the inside of the lid, and that every picture should have attached to its back the name and address of the contributor, the name and number, the difficulty of recollecting and re-packing would be entirely removed, and the committee or its agent could discharge the duty of returning specimens with little trouble and no anxiety.

In regard to the Dublin arrangements, the chief neglect appears to us to have consisted in silence.* If letters addressed to the General Secretary had received an explanatory answer; or, better still, if, at the close of the exhibition, a circular letter had been addressed to all contributors, stating that the contributions would be returned within a given time, and that persons anxious to receive them earlier could only do so by applying personally or by their agents, all anxiety based on the neglect of former exhibitions or on rumours would have been removed, and all cause for complaint obviated. We now subjoin Sir Joscelyn Coghill's letter, and again repeat that we hold him personally altogether absolved from the semblance of blame:—

Dear Sir,—I saw with regret in the number of the Photographic News for the 5th inst., that "An Old Photographer" had experienced some difficulty in getting back his frames from the Dublin International Exhibition.

As Director of the Photographic Department, I could not but take to myself some of the "winged words" launched against "amateur committees," especially as circumstances,—those parcæ under whose rule even "An Old Photographer" must sometimes bend—prevented me from being present at the repacking of the cases. As I had, however, left behind a most efficient staff to carry out that process, I was much astonished at the complaint, but determined to postpone my reply until I could hear from Dublin on the subject.

I have just received a letter from the Secretary, enclosing an extract from one written in reply to his enquiries, by the gentleman who had undertaken the above duties. He says:—"All the photographs which were not packed when I undertook to look after the men engaged in the packing, were forwarded to their respective addresses on the 30th of last month, with the exception of a few for which I had no address, and one or two other cases, the exhibitors of which have been written to." Now, bearing in mind that the exhibition only closed late in November, and remembering the immense number of packing cases which have to be sorted and re-distributed among the various departments of an International Exhibition, I think you will agree with me that a month or six weeks is not a very excessive time to expect exhibitors to wait before the return of their goods. And as for those whose photographs have not yet been returned for want of an address, they must blame themselves for not acting in accordance with the third "Special Regulation," which stated "that each photographic picture, or frame of pictures, must have a descriptive label pasted on the back, detailing the subject and process; *it must also state the name of the photographer or exhibitor, his address,*" &c., &c.

I very much regret that "An Old Photographer," if in a great hurry to get back his frames, did not write to me in the first instance. As director of the department I should probably have been able to assist him, and at all events I think I could have satisfied him that there was no unreasonable delay.

His last charge I scarcely know whether to take in jest or earnest. He accuses us of dishonesty—that we have peculated his packing case! To say the least of it, this construction is not a very charitable one, and I think most people will attribute his loss to his own impetuosity in reclaiming his property by a private agent instead of exercising a little patience, and waiting till the cases could be properly sorted. I am unacquainted with your correspondent except through the medium of his agreeable pen, but if he will entrust me with his real name and address, I hope I shall be able to recover and forward, even now, the missing case.

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* We have heard of a case in which a contributor has to the present time only received part of his specimens back again from Dublin. This is possibly due to neglect of some of the conditions of identification.

I have passed over some other minor accusations, not because they are unanswerable, but because I have already trespassed too much on your space.—I remain, sir, yours very faithfully,

J. J. COGHILL,
Late Director, Photographic Department,
Dublin International Exhibition.

Glen Barrahane, Castle Townsend, 12th January, 1866.

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ON GELATINO-IRON DEVELOPERS.

BY DR. HERMANN VOGEL.

MANY experiments have been already made with the new collo-developers with different results. As, for the elucidation of truth, many experiences are often necessary, I have, for the purpose of testing the various contrary assertions and opinions on the subject, made a series of comparative experiments with the ordinary iron developer and different gelatino-iron developers. As the best object, I have used a bust of marble with a black drapery. This object contains as well very deep blacks and very bright lights. A series of negatives was made immediately, one after another, and developed with the different solutions.

Plates Nos. 1, 3, 5, 7, with the iron developer made as follows:—

Sulphate of iron	3 parts
Acetic acid	3 ,,
Water	100 ,,

The other plates were developed with gelatino-iron developers.

Results.

1st. Plate No. 2 with Cherrill's developer, the iron solution before named being mixed with one-tenth sulpho-gelatine solution. The high lights were much more intense, but the shadows thinner and not so well softened as with the ordinary developer.

2nd. Plate No. 4.—Iron solution mixed with one-twentieth sulpho-gelatine solution.

Results—the same as before.

3rd. Plate No. 6—

Sulphate of iron	3 parts
Of a solution of 1 part gelatine in 8 parts acetic acid	1½ ,,
Water	100 ,,

Results.—the same as before.

4th. Plate No. 8—

Sulphate of iron	6 parts
Of a solution of 1 part gelatine in 8 parts acetic acid	3 ,,
Water	100 ,,

Results—The high lights a little more intense, and the shadows nearly, but not quite, so good in details and softness as with the ordinary developer.

The experiments with the last developer (from No. 8) were repeated on a dull day.

Results.—The same as with the ordinary developer, only a little more intensity in the lights with the gelatine developer.

From these results it follows that the gelatine compound increases the contrasts in the negatives, and induces a tendency to hardness. Therefore, the gelatino-iron developer is excellent for reproductions of subjects without half-tones; but for obtaining half-tones with this developer it is necessary to augment the quantity of iron (as in No. 8), or better to take the ordinary developer.

As an intensifier, I use the gelatino-iron developer with excellent results; but the plates treated with it have a failure very disagreeable—the tendency to splitting of the film, and to separate from glass whilst drying. I have lost in this manner some very good negatives.

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Stray Papers on Photography.

BY NELSON K. CHERRILL.

No. 1.—ON THE QUESTION OF CHEMICAL CLEANLINESS.

IN photography, as in everything else, success depends upon proper attention to minute details. The question of chemical cleanliness, though in itself but a small thing to attend to, is a matter of vital importance in all matters connected with photography. But even in the pursuit of cleanliness, though care may be pushed to extremes and caution to fussiness, yet the goal may be far in advance; the energy may have been wasted and misdirected through "want of understanding."

It has been well said that the "first step in education is to learn *what* is to be learned." In photography, an excellent starting point is to learn what ought to be cleaned, and how to clean it.

Though it is not my object now to give many details upon this subject, a few general hints may not be out of place. In the first place, of the interchange of dishes, &c., used in photography. It has been often recommended, and not without some show of reason, that each dish, measure, funnel, &c., used in photography, should be kept to its own particular use, and never put to any other. This is all well enough when regular daily work is spoken of, but when any experiment is to be tried, any new process to be investigated, or the usual routine in any way varied, the rule is sure to be broken through, and then comes the question, what is the best way to ensure success under such or such circumstances?

The first and most obvious idea which will occur in regard to this subject is that in proportion to the instability of any compound, must care be used in ensuring its freedom from all foreign matter which might prove injurious to it, and *vice versâ*. By way of example, suppose a glass measure has been used for mixing a toning bath of chloride of gold, &c., the same glass might be used for measuring the quantity of water to be added to the hypo for a fixing bath, without even taking the precaution of rinsing out the few drops of solution of gold which may have been left at the bottom; but, on the other hand, if the glass measure has been used for measuring a quantity of a solution of hypo, it must be most thoroughly cleaned before it will be safe to use it for a gold solution.

With regard to cleaning bottles, it would be well to remember that plain water, unless aided by friction, can only remove substances which it can dissolve, or which can be freely mixed with it. A small quantity of washing soda or acid (nitric or hydro-chloric) may be found very useful in aiding the removal of deposits formed by silver or organic matter, and if friction should be needed, a little common sand may be added. The method of rinsing out with water deserves a moment's notice. Water, however violently shaken in a confined space, has but little tendency to remove insoluble particles, unless it has considerable scour when subsequently poured out. If a bottle full of water is held neck downwards without a cork or stopper, the air slowly rising in bubbles so retards the exit of the water that any sediment, however carefully shaken up, will have time to resettle in greater or less quantities on the sides of the bottle before it can be removed. To obviate this difficulty it is simply necessary to whirl the bottle round two or three times the moment the water begins to run out, keeping the neck downwards all the time; this will impart a motion of rotation to the water, which will cause it to fly to the *sides* of the neck, and allow the air to rise in a continuous stream; the water, also, by running round and round the inside of the bottle, will clean it most effectually of all sediments or floating particles.

A small portion of an inexpensive solution may often be used with advantage to clear the way, so to speak, for a larger quantity. This especially applies to cases in which the two solutions mutually decompose each other.

A very excellent suggestion, and one which I have often availed myself of with great success, was given in a little work on the "Tannin Process;" it consisted of a mode of decomposing any silver left in a developing glass, by rinsing with a solution containing iodine and any soluble iodide, about twenty grains to the ounce of the latter with as much of the former as will dissolve. One application of this solution, which may be then returned to the bottle, will effectually prevent the decomposition of the next batch of developer. Of course a slight rinse must be given, but it is by no means necessary to remove all the deposit or sediment from the glass.

In dealing with so large and all-important a subject as chemical cleanliness, the results of neglect and inattention to the principles involved can scarcely be even hinted at; but it is not too much to say that four-fifths of the failures with which photographers, both small and great, are troubled, arise from want of cleanliness in some form or another.

The purity of photographic chemicals has been urged as the starting point of success, but I venture to think that proper attention paid to keeping ordinary chemicals quite free from contamination is as important, if not more so. The purest "bath" may be spoiled in a day by some of the messes sold as cleaning agents, and then what would be the use of praising the purity of silver?

The hundreds of times that our Editor has had to answer correspondents whose only fault has been that they did not take care to keep things all clean and in working order, and so have got into every kind of trouble and difficulty, will, I hope, be allowed sufficient to show that photographers do not always "practice what they know."

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ON THE HOT WATER PROCESS.

BY HERR HAAKMAN.

The dry process I am about to describe is not a new one, and nothing but a modification of the Fothergill principle. Although perfectly confident of its merits, I would not venture to bring it before the public if I had not some reasons to suspect that a great many amateurs still do want an easy and sure dry process, and that several have not derived the advantages from the tannin and other processes which they were led to expect from the great success of a few hard-working, pains-taking individuals.

In the outset, I may as well state that I do not claim this process as being the best; far from it. I have worked nearly all the dry processes, and have been generally successful, and, in my opinion, there is nothing to beat the original Taupenot or collodio-albumen. Those who follow out the valuable indications of Mr. Sidebotham and Mr. Mudd, as described in former volumes of this journal, will be well rewarded for their labour; only I would advise to add more bromide to the albumen; say, iodide and bromide in equal quantities.

The way in which I work is as follows:—

I use a so-called alcoholic collodion, which I always mix myself, to know in what direction to correct it if necessary.

The following is a good formula:—

Iod. ammonium	3 grains
Brom. cadmium	3 ,,
Ether	4 drachms
Alcohol	4 ,,
Pyroxyline	6 grains.

The collodion, being mixed, is left to settle for one or two days, and then carefully decanted into one of Squire's collodion bottles.

This formula (Mr. England's) is a very good one, and will yield soft pictures. As soon as circumstances, however, allow of experimenting, I intend to study the effect of more bromide and proportionally less iodide.

The plate, being collodionized, is immersed in the silver bath.

The silver bath, as I use it, contains at least 10 to 12 per cent. of recrystallized silver. When it is new, I put a little collodion in it, to saturate it with iodide and bromide, leave it to settle for a night, and filter it into a vertical bath. No acids whatever are added to it; in using bromide of cadmium, a double decomposition takes place, forming bromide of silver in the collodion, and nitrate of cadmium in the bath, sufficient to keep up a neutral and afterwards a slightly acid reaction. The use of a vertical bath, when the plates are not too large (say up to ¼ or even double extra), I consider advantageous, because it allows of a more rapid and equal evaporation of the ether and alcohol; the plate being constantly moved up and down, until all stains and greasiness disappear. This effect being obtained, the plate is left a little longer in the bath. In removing the plate, I lift it very slowly, so that only very little of the solution follows it; I keep it sideways over the bath, to let it drain for a few moments, and afterwards put it with the corner from which the superfluous liquid drains off on a pad of clean blotting paper. I also rub the back with blotting paper to take off the silver solution. The plate is now thoroughly washed under a tap, filled with rain-water. Practically, there is no limit to the washing, and it is impossible to wash too much. As a rule, I continue washing after the greasiness disappears, taking care to rub the back of the plate. The plate, being well washed, is again drained on clean blotting paper, and the back rubbed dry.

The plate is now ready for the albumen solution.

The albumen solution consists of, say, five eggs, five ounces of water, and a few drops of ammonia. The quantity of eggs is immaterial, only taking care to add for each egg one ounce of water. The white is carefully separated from the yolk, and should any of the gum adhere to it, it must be taken out with a silver fork or a clean piece of wood. The whole is well beaten together into a stiff froth (using a bundle of quills, with the feathers taken off—the whole operation does not take ten minutes), left to settle for a night, covered with a glass plate to prevent dust from falling into it, and filtered through a bit of wet sponge into a clean bottle. Put a small lump of camphor into it, and it will remain sweet for a very long time.

Flood the plate with the albumen solution in the following way:—Take the plate by the left hand bottom corner, keep it nearly horizontal, and pour some of the albumen at one of the upper corners. Gradually incline the plate, so that the liquid flows evenly over it, and let it come off from the right hand corner, taking care that it does not flow back. All the water that adhered to the plate will be forced away. Repeat the operation with some fresh albumen, drying on blotting paper for a few moments, and the plate is ready for the hot water bath.

In a horizontal tray, a little larger than the plate, I pour as much boiling water as will be sufficient to cover the plate. Tilt the tray, and put the plate, collodionized side up, at the other hand. Return the tray briskly to its horizontal position, so that the plate is covered at once with the boiling water; take the tray in both hands and keep it in motion for half a minute, so that the sensitive film is everywhere under water. Take it out with a silver or whalebone hook, and again wash it thoroughly under the tap. Drain it, wipe the back with blotting paper, and put aside to dry in a box.

The box wherein I dry the plates is generally a wooden one; the bottom I cover with blotting paper, four or five thick; to keep the plates from the perhaps injurious contact with the wood, I put a piece of clean glass vertically against each of the sides, so that the upper parts lean on glass. The next day the plates will be generally thoroughly dry. They may also be dried by artificial heat either before a brisk fire, or by putting a bottle of hot water in the box, against which they rest with the upper end.

The plate is now ready for exposure, but before putting them in the dark slide, the back should be rubbed perfectly clean with blotting paper or a little cotton wool slightly wetted with alcohol (I insist on cleanliness of the back to prevent all sorts of stains in the development).

The time of exposure is very short, but should be found out by the operator himself; it is impossible to give any data. When there is occasion, I say, go on the safe side, and expose for the shadows; the lights take care of themselves.

Before development the plates are again well washed under the tap.

So many excellent modes of development have been given in these pages, that it is only necessary to refer to them to ensure success. The common pyrogallic acid developer—

Pyrogallic acid	3 grains
Water	1 ounce
Citric acid	2 grains,

with strengthening silver solution 2 per cent.—is a very good one. Great care, however, should be taken not to force the development. Frequently (judging from my own experience) beginners get impatient, and wish the image to make its appearence as soon as the developer is applied. Is this not the case, they apply the silver solution with an unsparing hand, and are sure to spoil the picture. Let them remember that a good negative may be brought out (unless it has been very much under-exposed, when nothing will make it first-rate) with very little silver, only a few drops. (For this reason, I indicate a strengthening solution weaker than is generally used, so that in case of misapplication the harm done may not be too great.)

After the first addition of a few drops of silver (the plate having been previously treated with the pyrogallic solution) the operator should carefully watch the results. If the development proceed regularly, he should not add any more silver. If all the detail be well out, and should he find it necessary to strengthen (always keeping in mind that dry plate negatives are far more non-actinic after drying than ordinary negatives), he should take a little fresh developing solution with a few drops of silver, which will give him the desired intensity. Should the developer turn muddy, which very seldom takes place in this process, he must wash his plate, front and back, at once, and use fresh developer in a clean glass.

I wish, however, to describe another mode of development which has given me uniform good results, viz., by gallic acid and acetate of lead. Make two solutions :—

A. gallic acid in boiling water. The strength will be about 16 per cent (in cold water it would only be 1 to 2 per cent.) Cool, filter, and add 5 per cent of acetic acid.

B. acetate of lead in water: strength 2 per cent: filter.

To develop proceed as follows :—

Wet the plate all over, and flow it with solution.

A. return it to the glass measure, add a few drops of silver to 2 per cent., and a few drops of solution B. A precipitate takes place; stir it briskly in the glass measure, and flood the plate with it, precipitate and all. Generally the picture appears at once in all its details, and frequently, but not always, of the necessary strength. (The colour of the deposit, being greenish, is very non-actinic.) This developer acts like a strong iron solution in the wet process. Should it be necessary to intensify, the plate is well washed, and pyrogallic acid with a little silver applied. Some of the best negatives I ever had were obtained by this developer, which I use generally. It allows of a very short exposure, and will well repay a trial where dark foliage, &c., has to be reproduced.

This communication seems rather lengthy; the process is, however, very simple, and only amounts to the following operations :—

1. Collodionizing.
2. Sensitizing and washing.
3. Applying of the preservative, immersing in hot water, and washing.
4. Drying.
5. Exposure.
6. Development and fixing.

The film is exceedingly tough; there is no danger of splitting, wrinkling, or tearing up, so that the plates need no preparatory albumenizing, or covering of the edges with varnish. In fact, the whole is so sure that I work a dry plate in preference to a wet one. With the gallate of lead developer in a good light, and one of the new rapid lenses, I feel confident that instantaneous pictures may be obtained, provided always the collodion be *highly* bromised.

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Recent Patents.

MECHANICAL RELIEF IN PHOTOGRAPHIC PORTRAITS.

BY B. W. BENTLEY AND W. H. BAILEY.

The object of this invention appears to be to produce a singular kind of relievo-photograph. We make our extract from the provisional specification, which, if it be less explicit as to what is covered by the patent, possesses more details of interest :—

This invention relates, firstly, to improvements in finishing photographs on paper after they are mounted on the cardboard or other description of mount, and consists in subjecting the mounted photograph to pressure under an improved photographic press (hereinafter described), whereby an exceeding smooth surface is produced, and then placing the photograph between dies in a fly or other ordinary press, in order more or less to raise the most prominent parts of the picture, and cause them to stand out from the background, so obtaining a picture in "relievo." The dies for producing such effect may be engraved, etched, or sunk in the ordinary manner, or they may be made by the process hereinafter described in the second part of this invention.

Secondly, this invention relates to a novel method of producing transparent photographs on paper and other suitable substances, similar to the ordinary porcelain transparencies, and consists in taking a photograph of the desired object by the "gelatine process," then taking a cast in plaster of the photograph so produced, and afterwards pouring molten type or other suitable metal into the plaster mould, so obtaining a die in "relievo," which will be an exact copy of the photograph. If the die is then fixed in a fly or other suitable press, and a sheet of paper (plain, tinted, or otherwise), or other suitable substance, be placed beneath it, and such die is caused to descend upon the paper or other material, an "intaglio" copy of the photograph will be produced, which, when held up to the light, will be found to be a beautiful transparency, more perfect in its effect than the ordinary porcelain transparencies. Such transparencies may be useful for ornamentation, and when used for windows and shades for lamps, we prefer to enclose the transparency between two sheets of glass having an air-tight rim round the edges to exclude dust.

By means of this invention we are enabled to produce medallion portraits in "relievo;" imitation "cameos" may also be obtained by colouring the background according to taste, and the effect of such pictures may be heightened by mounting them behind convex glass.

And, thirdly, this invention relates to an improved photographic press, which consists of a suitable rectangular framework, having brackets or pedestals at each side to receive bearings for a roller. A sliding plate travels upon the top of the framework, between the brackets or pedestals, and beneath the roller, and is actuated by a link connected to its under side, the other end of the said link being connected to a lever jointed to the end of the framework. On the top surface of the sliding plate a sheet of aluminum bronze is fixed, which can be brought to a very fine polish, and is less liable to corrosion than steel. The roller is pressed upon the sliding plate by screws in the ordinary manner. The mode of operating this press is as follows :—When the sliding plate is at one end of the framework the mounted photograph is placed with its face downwards upon the aluminum bronze surface; the lever being then pushed forward, the sliding plate travels beneath the pressing roller, taking the photograph along with it, and during its passage beneath the roller the necessary pressure has been imparted by the screws, and an extra smooth surface produced on the photograph.

USING TWO PRINTS TO FORM ONE PICTURE.

BY LOUIS STRELISKY.

This is another modification of the numberless methods which have been published or patented for using a print made transparent superimposed over another, with a plate of glass between them, to form one picture, the underneath picture being coloured or not as may be chosen. In this instance a provisional specification, based on a communication from a Hungarian photographer, was lodged by Mr. Gye. The method is stated as follows:—

This invention has for its object the so mounting photographic, printed, and other pictures that peculiar effects are produced by reason of two pictures in each case being combined with and superimposed one on the other on a sheet of glass. The two pictures are produced on paper, one on thin paper, and the other on ordinary photographic or printing paper, as the case may be. The picture on thin paper is made transparent by means of spermaceti, or varnish, or other adhesive matter, and is made thereby to adhere to the glass. In some cases the glass is ground or deadened on the side where the transparent picture is applied. It is preferred in all cases that the two pictures should be tinted or colored artistically according to the effect desired to be obtained, but this is not essential. Supposing it is desired to mount two photographic pictures according to this invention, in order to produce a colored miniature or colored picture of a person, two pictures are taken from the same negative such as is used by artists when colored photographic pictures are to be produced; one picture is on thin photographic paper, and the other on other photographic paper. The picture on thin paper is tinted or colored, and then rendered transparent and caused to adhere to a sheet of glass by means of spermaceti, or varnish, or sufficiently transparent cement. The other picture is also tinted or colored, and is placed carefully at the back of the other picture, and is retained correctly in position either by adhesive matter or otherwise, and the whole so combined are then placed in a frame. In like manner printed and other pictures are combined together and with sheets of glass.

BACKING TRANSPARENT POSITIVES.

BY EDWIN PETTITT.

This consists of a method of backing transparent positives so as to cause them to form pictures by reflected light. The principle was not new, and a provisional specification only was entered. It proceeds as follows:—

My invention consists, firstly, in the following manner of giving permanence to glass transparent positive photographs:—I coat or cover the collodion side of the said photographs, or the side of the glass on which the picture is situated, with plaster of Paris, cement, wax, or other opaque or semi-opaque substance, either white or tinted with colour, and I afterwards cover the said plaster of Paris, cement, wax, or other substance with a coating of metal, which coating of metal may either be applied by the electrotype process or be applied in the form of thin sheets or foil attached by any adhesive matter. By the treatment described the picture is securely protected from the injurious effects of air and moisture, and great permanence in the photograph thereby secured.

My invention consists, secondly, in ornamenting transparent glass positive photographs by coating or covering, either wholly or in part, that side of the glass on which the picture is situated with coloured materials, such as velvet, silk, or other fabric, gold and silver leaf, and coloured bronzes, and afterwards coating the photograph in the manner constituting the first part of my invention when permanency is required. By the use of the coloured materials described, any required tint may be given to the whole or part of the photograph, or it may be tinted of different colours in different parts.

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THE NEW DEVELOPER.

BY F. A. WENDEROTH.*

Many have been the devices and suggestions to improve the developer for negatives; but, so far as I know, they have been crowned with but little success; and the mode of making negatives by the wet process is to-day about the same as it was when I first commenced to practise photography, thirteen years ago. In the management of the silver bath and the manufacture of gun-cotton, great progress has been made, and, in consequence, the results obtained are more uniform than formerly. Thirteen years ago the iron developer was the same as the one now in general use; all additions of organic and other matter have not only proved useless, but in many instances injurious. There is one indisputable fact, namely, that when either the collodion, the silver bath, or the timing has been faulty, no developer of any kind will remedy it. The plainer the developer the better. Iron solution, not so strong as to produce streaks, not so weak as to work slowly, and just enough acetic acid to make it flow uniformly over the plate, has, in my hands, proved to be superior to anything else.

A great deal has been said and written about how to obtain dense negatives, which to me are always objectionable. It is soft pictures, with good details in the high lights and in the shadows, that we want.

When Mr. Carey Lea's developer was first spoken of, it was claimed for it as one of its chief properties, to produce dense negatives without re-development, and that negatives would not fog, no matter how long the developer was kept on, which, without doubt, is a great recommendation in the eyes of some. With everything in good working condition and careful manipulation, fogging will be a stranger to the common acetic acid and iron developer, and any amount of density can be obtained by the use of it.

Warned by the experience of others, I did not feel like losing time in trying to make the new developer, but availed myself with pleasure of the opportunity to give it a trial, as Mr. Lea had presented me with a sample made by himself, the results of which I laid before the Philadelphia Photographic Society, at its December meeting.

For comparison, two other samples of developer were used. One was the common acetic acid and iron developer, and the other a modification of Mr. Lea's, published by Mr. Cooper, jun., some time ago.* Everything was in first-rate working order. The first negative was developed with acetic acid and iron, to ascertain the proper time of exposure, which proved to be twenty-five seconds on a 7 by 9 plate, ¾ length figure. The result was perfect in every respect, very clean, plenty of detail in the highest lights and deep shadows, giving a vigorous and at the same time a soft print. Time of development, twenty seconds; no re-development.

The next plate was developed with Mr. Lea's developer. Time of exposure, twenty-five seconds. Proved to be undertimed by ¼ to ⅓. Negative clean, with high lights more dense, and shadows more transparent, and less detail than in the negative with the acetic acid; but I think that with a longer exposure a better result would have been obtained. The time of development was one minute and thirty seconds. When the developer first was poured on the plate, it refused to flow evenly, and acted like the common developer with too little acetic acid in it. I therefore had to add one ounce of acetic acid to eight ounces of the developer. I am confident that to have kept the developer on the plate for a longer time would not have improved it, as the high lights were strong enough.

The third negative was developed with Mr. Cooper's modification. Time of exposure, 25 seconds; time of development, 1½ minutes. This developer ran slimy and smeary over the plate, producing air-bubbles, and running off quite stringy. The time of exposure appeared to have been only one-half of what it should have been, too strong in the high lights, and quite black in the shadows. Repeated trials gave the same results.

The colour of the negatives is different in the same proportion as the light effect. So the negative by the common developer shows a solid close deposit of silver of white colour in the high lights, and brownish in the shadows, looking very much like a sepia drawing. The colour of the negatives by Mr. Lea's developer are more greyish, not showing the difference in colour, and the deposit of the silver less close. In the negative by Mr. Cooper's modification, the silver deposit is of an almost black colour, and not close.

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* *Philadelphia Photographer.*

See Mr. Cooper's articles in our last volume.

Mr. Coleman Sellers' and Mr. Graeff's reports of experiments showed about the same results as obtained by me. Both had been favoured by Mr. Lea with some of his developer; both had worked with chemicals in the best condition; had scratched the plates with the diamond before exposure, and before development separated them. One developed with the common acetic acid and iron, the other with Mr. Lea's developer.

Mr. Lea admits the slow working of the developer, but does not think it of importance. Practical photographers might think differently, and he would perhaps think so too if he had a dozen or more persons waiting to be attended to, every one taking hold of him as often as he shows his face, telling him over and over again he has no time to wait any longer. In landscape photography it is equally important to work quickly, as light effects and the winds are not at our command, and it would be very inconvenient to carry levelling stands whereon to conduct the development at leisure.

Mr. Tilghman, who had succeeded in making the new developer himself, was quite pleased with it, but had not made any comparative experiments. Dr. William Thompson, of Washington City, whose paper was read at the same meeting, seemed to be of the same opinion as Mr. Tilghman, and supported his views by several negatives.

To make comparative tests, it is of the greatest importance that everything used should be in the best order. Was this so in Dr. Thompson's case? No. In the beginning of his paper he says :—" The imperfections due to the collodion, impure bath, and careless manipulations, will be ascribed not to the developer," &c., &c., &c. This should end the controversy at once.

But, without telling it himself, a practised photographer would see in Mr. Thompson's negatives, developed with the common acetic acid developer, that his chemicals were in a bad working condition, and the only difference between them and those developed with the ferro-gelatine developer, as modified and prepared by himself, was that the latter were harder; and it was the opinion of several of the gentlemen present that the prints from the negatives developed with the common developer were preferable to those by the ferro-gelatine, showing more detail and giving a softer picture, just the reverse of what Dr. Thompson tried to demonstrate. The only point proved by Dr. Thompson is that, with chemicals out of order, more dense negatives without re-development might be produced by the ferro-gelatine developer of his own make by long development than by the common developer. This is likewise applicable to the experiments of Dr. Tilghman, who said that his chemicals were often in the condition of Dr. Thomson's, and therefore he gave the preference to the ferro-gelatine.

In my opinion the test stands as follows :—

	Acetic Acid Developer.	Ferro-gelatine.
For time of exposure ...	1	2
For time of development ...	1	2
Certainty, dispatch, and conveniency of preparation...	1	2
Absence of fogging	2	1

Of course I do consider these experiments conclusive, and hope to be able to report at the next meeting of the Society the results obtained by new tests.

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ON THE WIDE-ANGLE LENSES RECENTLY INTRODUCED BY MR. DALLMEYER AND MR. ROSS, WITH ILLUSTRATIONS.

BY R. D. CLARK.*

At a meeting of our Society in May last, a paper by Mr. Ross was read, in which he described his new wide-angle actinic doublet. On the same occasion I exhibited a few negatives taken with wide-angle lenses of various kinds.

The subject treated by Mr. Ross was to me a very interesting one; and, impressed with the great beauty of the photographs of the Crystal Palace, by which the paper was illustrated, I suggested to our Secretary that it would be desirable to get some of these lenses for trial. Mr. Johnston wrote to Mr. Ross on the subject, who most kindly sent a 10 by 8 and a 12 by 10 lens. These were put into my hands. At my reqnest Mr. Dallmeyer also sent a 10 by 8 and a 12 by 10 wide-angle lens, in addition to the smaller one I already had. It is the results of my experiments with these lenses that I propose to lay before you to-night.

As the optical peculiarities of the lenses have been described by the makers, I need say nothing on that subject. In both, the stops are most conveniently arranged on a revolving disc, and, being fixed to the instrument, are always at hand, and no time is lost in changing them as in the old form. Mr. Ross's lens has, in addition, an internal shutter like an imperforated stop; this is an additional convenience, as it serves the purpose of a cap, which latter is sometimes not to be found when it is wanted in the field. This shutter is intended to serve for a sun-shade as well.

Before I received the larger lenses, I made some experiments with Dallmeyer's No. 1 patented lens. Its equivalent focus is 7 inches. It has five stops; the largest is 1-15th of its focal length, or ·46 of an inch, and its smallest 1-35th of the focus, or ·199. It is stated to cover a plate 7¼ by 4½ with the largest, and a plate 9 by 7 with the smallest stop. I used it with plates 8½ by 6½, and generally with the stop 1-30th of its focal length, or about a quarter of an inch.

I compared it with the No. 2 triplet of the same maker, by taking views in our city from the same points without moving the camera-stand. I produce these views, and you will see that, by a very rough estimate, it might be said that on this size of plate the new lens includes almost twice as much of the subject as the No. 2 triplet. That the lighting and the definition all over the plate is more satisfactory is shown by some views of Swiss scenery, by Mr. England, on the same size of plate as I tried. It seems to me that mountain scenery has never been better rendered by photography than in some of these prints by Mr. England. Mr. George Wardley has also sent me a large collection of prints done by this same 7-inch focus lens. These are smaller in size than the others, 7¼ by 4½ plate. Mr. Wardley generally used a stop 1-25th of the focal length, but one of his specimens is with the full aperture of the lens. These beautiful little prints by Mr. Wardley are all by the collodio-albumen process; they are remarkable both for delicacy and brilliancy, and show how little photographers know of dry-plate work who say it can only produce hard, black and white effects.

To test the rapidity of this lens, I tried four views of the same subject (St. Anthony's Chapel), on collodio-albumen plates, the exposure varying from twenty seconds up to five minutes, using the smallest stop; they all developed to fair negatives. A lens that gives a negative of a well-lighted subject on a plate 8½ by 6½ in twenty seconds and upwards, by a dry process, cannot be called a slow-working one.

Mr. Dallmeyer's 10 by 8 lens, or No. 3, has a focal length of 10 inches; and his 12 by 10, or No. 4, is 12 inches focus. I used both of these lenses, with plates 11¼ by 9¼, for some negatives taken at Inverary and at Tantalton Castle. I produce prints from these, and have marked on them the lens that was used and size of stop. You will see that the No. 3 lens of 10-inch focus covers the 11 by 9 plate with perfect definition up to the very edge, and could no doubt be used with a plate a size larger.

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* Read before the Photographic Society of Scotland.

The result of these trials satisfied me that Mr. Dallmeyer's new lens accomplishes all that he said it would. The image on the ground glass is bright and sharp, and the light equally distributed over the plate. The angle included is a large one; and it can be used with stops of a moderate size.

I noticed that my photographic friends, in looking at the image on the ground glass for the first time, generally uttered an exclamation of surprise and delight at its beauty.

This lens was introduced as a landscape-lens only. I shall, by-and-by, refer to what can be done with it in architectural subjects.

Mr. Ross's lens was introduced specially for architectural subjects, landscapes, and copying. Mr. Ross has sent for exhibition a number of maps and copies of engravings to show how admirably it works as a copying-lens. With regard to the copies of the engravings, he requests me to make an explanation which I am sure you will feel, with me, is quite unnecessary. It is regarding a very slight uneven edge on some of the prints; this arises from the old and soft paper of the original engravings not having been stretched whilst they were being copied. The copies of the maps will show that the lens gives lines absolutely straight. These copies are all of the most perfect kind.

The lens is produced in two forms, the "ordinary doublet" and the "wide-angle doublet." My experiments were made with two of the ordinary doublets—one for pictures 10 by 8, and another for 12 by 10.

The equivalent focus of the first named is 9 inches, and of the other 11¼ inches; so they are slightly shorter in focus than Dallmeyer's lenses for the same sized plates. The stops are also smaller, the largest stop for the 10 by 8 lens being ·45, and the smallest ·175 of an inch, or about the 1-20th and the 1-50th of its focal length. For the 12 by 10 lens these stops are ·618 and ·2 respectively. Each lens has six stops.

This lens not only includes a very wide angle, but gives lines perfectly straight up to the very edge of the picture. This is shown by a number of beautiful photographs of architectural subjects sent by Mr. Ross for exhibition.

I took a view of the viaduct on the Tweed at Leaderfont with the 10 by 8 lens, using a plate 11¼ by 9¼. I levelled and focussed the camera with the greatest care, and whilst doing so had a curious illustration of the accuracy of the lens. I was examining the plate all over with a magnifying glass, looking out for any fault that might exist in the lens. I noticed near the margin of the plate that one of the tall piers of the bridge was twisted in two places, and suspected the lens was not so perfect as it was said to be; but on looking up I found the distortion was not in the lens, but it was the pier itself that was twisted—a fact I had not noticed till I observed it on the ground glass. I think this photograph shows that this lens *does* include a very wide angle, combined with *perfectly* straight lines. A more distant view of the same bridge with a large group of trees satisfied me it could be used satisfactorily for simple landscape as well as for architecture.

I took four negatives of Melrose Abbey with Ross's lenses, intended as crucial examples. I selected Melrose for this purpose, as probably no building in Scotland has been more frequently photographed. I make bold to say that, from the best points of view, the *whole* building had never been included in one plate till these new wide-angle lenses were used.

When Mr. Dallmeyer sent me the first of his new lenses, he wrote that I must remember it was chiefly intended for landscapes, and it would not do for architectural subjects much beyond the usual angle. On looking at the image produced by it of the buildings seen from my windows, it struck me that Dallmeyer scarcely did justice to his own production. I resolved to try it at Melrose also, and so went there with the intention of taking views with the same camera, from the same points of view, with the lenses of both makers. When there, Mr. Smith, of Darnich, kindly offered to assist me; and as he had also an 11 by 9 camera with a flange that suited Dallmeyer's 10-inch focus new lens, we set to work. I used Ross's 9-inch and 11¼-inch lenses with collodio-albumen plates, and Mr. Smith used wet collodion with Dallmeyer's 10-inch lens.

We each took three views from the same points, prints of which I produce. Of course there will be a difference of development with two persons working according to difference of taste; but this will affect the light and shadow only, and so to some extent the general effect of the photograph; but that will not in any way affect the straightness of the lines, the lighting of the plate, the sharpness, or the amount of angle included.

The members will judge for themselves how far the lenses have done their work satisfactorily. It will be observed that when both the 10 by 8 lenses were used from the same point, Ross's includes a little more of the subject; but, on the other hand, its power is more nearly exhausted than Dallmeyer's. The latter lens would cover rather the larger plate. There is a marked difference in the lighting of the plate by the two lenses. In Ross's the brilliancy of the light falls off gradually from the centre to the margin. This necessitates the development being forced more at the side than the centre. This is probably more easily managed with wet collodion than with dry plates, such as I use.

These examples will probably illustrate fairly what class of architectural subjects may be taken by Dallmeyer's lens when the extreme angle is included. If, in such circumstances, there were vertical lines close to the margins of the picture, the whole width of the picture, or nearly so, I would use Ross's lens rather than Dallmeyer's; but in all such cases I would prefer my old favourite the triplet, where it would include the subject, in preference to either of these new ones, simply because with the triplet such a large stop can be used with perfect definition.

So far as the stops are concerned, Dallmeyer's lens has the advantage, as will be seen by comparing the size of stops of the respective instruments, or the stops used as marked in the pictures I have shown you.

That pictures of the best quality can be produced by both of these new lenses is proved by the numerous examples I am able to lay before you, taken by some of the best photographers in England. In the bound volumes you will find many fine pictures by Ross's lens, the production of F. Frith, W. G. Collings, and others.

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Correspondence.

THE ORIGIN OF ALKALINE DEVELOPMENT.

Sir,—On my return home after an absence of two or three months, I was surprised to find, on looking through the Photographic Journals, that the subject of the discovery of alkaline development was again brought before the public and beg to return you my best thanks for your able advocacy of my claims. I will now ask you to grant me a portion of your space to supplement, by a few remarks, the article on the foregoing subject which appeared in the Photographic News of the 10th November last.

In my letter, dated the 16th December, 1862, and published in the Photographic News of 2nd January, 1863, I not only mentioned that ammonia alone would develop tannin plates, but that both it and carbonate of soda in combination with tannin would develop pictures on dry plates prepared by any process. It will be seen from this that my experiments were much more in the line of alkaline development than Major Russell's, for up to the date of the above-mentioned letter tannin was never regarded as a developer, but was rather recommended and used as a preservative. Major Russell, in his experiments, used ammonia in combination with pyrogallic acid, the latter of which had been long previously well known as a dry plate developer without any addition whatever; consequently, the Major's process cannot strictly be styled alkaline development, inasmuch as pyrogallic acid would cause the developing effect independent of the alkali. It was not from imperfect knowledge of the facts that the editors of the *British Journal* gave the credit of the discovery of the developing property of carbonate of soda to Mr. Sutton, for in a letter dated 17th December, 1864, and published in the *British Journal* on the 23rd same month, I directed their attention to my letter of the 16th December, 1862, published in the Photographic News on the 2nd January following, announcing the discovery; but I must say that from the very first I met with but scant justice from the editors of the *British Journal*, for in spite of my repeated letters directing their attention to the published facts, they persisted in ignoring my claims.—I am, Sir, your obedient servant, Thomas M. Leahy.

Dublin, January 23rd, 1866.

THE POINT OF SIGHT IN A PHOTOGRAPH.

Sir,—Suppose a card lens to be four feet from the floor of the studio and slightly dipped (this is the position Mr. Dallmeyer recommends for his 2 B), and 19 feet from the sitter, the point of sight will be about 3 feet 10 inches from the bottom edge of the background; this is also the vanishing point of all horizontal lines in parallel perspective, and determines the height of the horizontal line, or termination of the ground plane. It consequently follows that the head of the model must be backed by the sky, unless intercepted by mountains, trees, &c., an effect which an artist would decidedly avoid as tending to confusion.

In background painting, aerial perspective is gained by using close tints, it being obvious that the nearer the tint of an object resembles the sky, the more distant it will appear, and little or no detail will be perceived. The reason why background-makers paint in miniature is because a large amount of subject can be crammed into a small space, and pretty pictures made, which (as the majority of photographers are not artists) sell well, and unfortunately suit the public taste.

Good or bad backgrounds are simply a question of price. When photographers make it worth while for *artists* to paint for them, they will find no difficulty in obtaining what they require.

Those gentlemen who are "foggy" on the subjects of "lighting the sitter" and "posing," must study the principles of light and shadow for the former, and "outline drawing" for the latter, when their difficulties will speedily vanish.—I am, Sir, yours respectfully, R. A.

[If some skilful background painter would try the experiment of producing a few really artistic backgrounds, *not* crowded with small objects, *not* painted to produce pretty pictures in themselves, but to serve as natural and effective backgrounds to portrait figures, we think they would find plenty of customers at good prices. We know many very high-class photographers who complain that they cannot get such things at any price.—Ed.]

ON THE FORMATION OF THE PHOTOGRAPHIC IMAGE.

Sir,—Light being the primary cause of all the phenomena observed in the various photographic processes, a thorough acquaintance with its nature and properties is necessary to their elucidation.

The cause of natural light is evidently the passage of the solar rays through the atmosphere of the earth; and it has been found by careful experiment that its intensity and colour depend upon the speed with which they travel: at their greatest velocity no visible effect is produced, but as their speed diminishes from the resistance encountered in their passage through the matter of the earth, a graduated series of effects are impressed upon the eye, proportioned to the force with which they impinge on the organs of vision. To this circumstance is due the production of the effect of colour. If the solar rays are reflected off a surface capable of changing their velocity to one uniform rate of speed, the surface reflecting will appear the colour due to this changed velocity; and the purity of the resulting colour will depend upon the perfect uniformity of their rate of motion when so reflected.

By spectrum analysis it is found that the solar rays pass through the atmosphere at all velocities, the various rays being refracted or diverging from their course more or less according to their force of impact upon the surface of the prism contained in the spectroscope; this instrument therefore forms a convenient means of examining the nature of the solar rays, and the changes they are capable of effecting at different velocities upon bodies exposed to their influence. By passing the direct rays of the sun through the spectroscope is obtained the beautiful and well-known image of the solar spectrum. An examination shows that it is composed of bands of different coloured light, the lowest of the series being purple, then red, orange, yellow, green, blue, and violet, this latter colour being the highest of the series, and produced by rays passing at the greatest velocity capable of affecting the eye as light.

By testing the heating effects of the various coloured bands with a thermometer, it is found that the least refrangible of the solar rays are the hottest, and that there are rays below the purple which, although not visible, affect the instrument to even a greater extent than the visual ones. Again, on testing with sensitised paper for chemical actinicism, it is found that the upper or violet end is the most effective, and, further, that there are rays of still greater refrangibility passing above the violet, which, although not visible, are still even more powerful in producing chemical change. If a sensitised collodion plate be caused to receive the image of the solar spectrum, and after exposure is carefully examined with the microscope, not the smallest trace of change in its physical structure can be detected; yet nevertheless, if the usual developer be poured over the plate, a reduction and precipitation of metallic silver marks the spot where the solar force has been able to effect its lodgment in the body of the film, and this spot will be found to correspond with that part of the spectrum where the solar force is passing at its highest velocity, and therefore at its greatest momentum.

Two points may here be learned: first, a sensitised collodion film is unchanged by the solar rays unless they impinge upon its surface at a high velocity; and secondly, the solar force itself is a something material, as sensitised plates can be prepared that will not only receive but retain the latent image for days after exposure, and yet develop a perfect image.

Two other points now require explanation: What is the cause of the resistance to the passage and entry of the solar rays? and what is the nature of the action which occurs on the application of the developer?

Inherent in matter is a power of combination into forms of more or less density, solidity, and weight; by this force of cohesive attraction it exists in vast accumulated masses in space, forming, by the association of various elements, the whole planetary system. The research of the chemist has resulted in the discovery of upwards of sixty different elements of matter among the materials of the earth, each of which is found to possess its own distinctive and characteristic properties. It is the province of chemistry to discover the nature of these properties, their various combinations, and the changes in structure, physical condition, and chemical action, resulting from them.

The physical conditions presented in the combination of the materials of the earth are broadly recognized as of three kinds,—the solid, fluid, and gaseous; and as the same combination of elementary matter is capable of existing in all these forms, a presumptive proof is afforded by this fact that this cohesive power is controlled and checked by some other opposing force.

In this cohesive property of matter is recognized the cause of the resistance to the passage of the solar force, and the changes of combination and condition are the results of the contrary action of these two opposite forces of separation and cohesion.

In the preparation of sensitive photographic surfaces, combinations of matter are used in which (owing to the unstable character of some of the elements forming the combination) the cohesive force is exerted to the utmost to preserve the integrity of the compound; in this condition, when exposed to the attacks of the solar rays moving with great momentum, it is unable to prevent a further accumulation of this force, and although this increase may not result in producing any change in the structure of the prepared surface, yet when (as is the case when the developer is applied) a still more unstable combination of the elements of matter is produced, a reaction takes place, and the force of cohesion, extricating from the compound the most stable element it contains, precipitates it upon its antagonist in the endeavour to restore its equilibrium. —Yours very faithfully, THOMAS AYERS.

PS.—I am much pleased with Mr. Cherrill's paper on the theory of the chemical action of the various developers; it reads correctly, and supplies to me information which was needed on the chemistry of development.

It seems the statement in my paper that the instability of the solution present on the surface of the collodion film was increased by the application of the developer, was not correct; on the contrary, its application, by increasing the stability of the compound, enables the cohesive force to extricate the silver, and resolve it back to the metallic form.

Now, here comes another question; is its precipitation upon those parts of the film acted on by light caused by the attraction of the solar force, or is it, as stated in my paper, an endeavour of the cohesive force to drive off its antagonist?

The solution of this question I leave for future consideration. T. A.

SIR JOHN HERSCHEL'S CIPHER.

SIR,—In sending you my interpretation of Sir John Herschel's cipher, I made use of it to convey to your readers an idea of my own respecting the production of natural colours, and also with the hope that Sir John Herschel would (as he has done) make known the real signification in the following number of your journal. I wished to have added that the sensitive layer should be as thin as possible, but the cipher did not permit it!

I confess that, at the time, I supposed the cipher to refer to the production of natural colours, and knowing how much this eminent philosopher has already done for photographic chemistry, I expected that it would yield some hidden point, of advantage to photographers.

"... Que en esto de querer
Todo es hallar el vado!"

I am, sir, yours, &c.,
T. L. PHIPSON, Ph.D., F.C.S., &c.

London, 23rd January, 1866.

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Talk in the Studio.

VISCOUS IRON DEVELOPERS.—Mr. Bingham points out that Mr. Robert Hunt was the first to use a viscous iron developer. In the ferrotype process, published in 1844, the developer was composed of gum arabic and protosulphate of iron.

A CARBON COMPOUND SENSITIVE TO LIGHT.—Dr. F. Gottschalk has found that graphitic acid is sensitive to light, the minute yellow crystalline scales of which the acid consists blackening very quickly when exposed either to direct sunlight or to diffused daylight, or to any powerfully actinic artificial light. It is possible that the discovery may lead to that of some simple and satisfactory process of carbon printing. One of the chief difficulties in the way arises from the exceeding slight solubility of this singular body, which dissolves in water and alcohol only in very minute quantity, and not at all in any other menstrum that has yet been tried. Small, however, as is the proportion of it which will dissolve in water, paper soaked in its aqueous solution becomes reddish brown on exposure to light, any parts of the paper which may be protected from the light remaining quite white.

STABILITY OF GUN-COTTON.—A correspondent of the *Scientific American*, referring to the recent reports of Blondeau and others on the spontaneous decomposition of gun-cotton, says:—"I have, at various times, prepared large quantities of gun-cotton, and have never witnessed this liability to decomposition, and am inclined to think that, if properly prepared, using pure and concentrated acids, and very careful and thorough washing, it is a stable compound below 200° Fah. It is possible that, when prepared in very large masses, its formation is not so perfect or uniform throughout the mass, and the washing process may not extend to every fibre. I send inclosed a small sample of gun-cotton prepared by myself nearly twenty years since, soon after the announcement of Schonbein's discovery. You will find it, on trial, to be as good as now, although it has been exposed to all the vicissitudes of this climate during this long period, and for several years of this time in a very damp situation."

AMENDMENT OF THE PATENT LAWS.—In the final report on the Patent Laws by Messrs. Hindmarch and Greenwood, just issued, recognition is made of the necessity for some more efficient examination of claims before patents are granted, remarking "that the grant of patents for frivolous inventions would in many cases be prevented, and more definite information would be obtained respecting the nature of inventions sought to be patented." The importance of such examinations cannot be doubted. There exist on the patent records at the present moment specification after specification, describing photographic inventions which have been patented over and over again. The remedy suggested is, however, far from efficient: it is that "a person of skill, who could at once give to the law officer in every case the information necessary to enable him to determine whether the provisional specification sufficiently describes the invention, and whether the invention is a manufacture, or an invention for which a patent ought to be granted." It is quite clear that any one person would be altogether useless in such an office. In America it is the business of a number of competent persons, and they find the task no easy one. A morning contemporary says, the officer "would be invested with functions so various and extensive that, to fulfil his duties effectually, he must be a prodigy of technical and scientific learning. He must be familiar with all the arcana of art and science, from the most abstruse laws of magnetism, chemistry, optics, and mechanics, to the minutest details of every mechanical occupation. Such a living cyclopædia of knowledge is not to be found in the world."

THE "POPULAR SCIENCE REVIEW" AND PHOTOGRAPHY.—In the October number of the *Popular Science Review*, a quarterly magazine which is generally, so far as we know it, interesting and accurate, a *résumé* of photographic progress during the previous quarter was given, which excited some attention from the strange errors and misstatements with which it abounded. Our attention was repeatedly called to this; but we did not deem the matter of sufficient importance to notice it, beyond citing, when definitely asked the question, the evidence on the discovery of the action of bichromates on organic matter under the influence of light, the writer in the *Popular Science Review* having attributed the discovery that gelatine in contact with a bichromate became insoluble under the action of light to Mr. Fox Talbot. We stated that the discovery of the fact was made by Mr. Ponton years before; the explanation or law upon which the fact was based was discovered by M. Becquerel, and the application of it by Mr. Talbot. The writer of this singular *résumé*, instead of profiting by the information and the authorities given, simply repeats his statement, and charges us with error, adducing as a reason that in a paper of Mr. Ponton's, read before the Royal Scottish Society of Arts in 1839, and recently republished in a contemporary, there is no allusion to "gelatinous substances." He altogether ignores the essential evidence in the case—the researches of M. Becquerel on the action of light on bichromate of potash in contact with organic matter. Mr. Ponton at first simply discovered the fact that paper treated with bichromate of potash was changed by light, the soluble bichromate becoming, as it appeared to him, insoluble. M. Becquerel, in 1840, entered into a careful examination of the subject, and ascertained that it was the size (generally gelatine) of the paper which became insoluble under the action of light and a bichromate. Examining further, he found that this action extended to various organic bodies which were, when in contact with a bichromate, thus rendered insoluble by the action of light. Mr. Fox Talbot, in 1852, twelve years afterwards, patented a method of photographic engraving, in which he employed bichromate and organic matter for obtaining his image on the steel plate. So far as we know, Mr. Talbot has never laid any claim to the discovery whatever, although he has the undoubted claim to its valuable application. In the first part of the specification of this patent he simply refers to the matter by saying that "by the methods which are employed in the art of photography an image or picture is formed" on the metal plate. In his summary of claims he includes, not the discovery of the action of light on gelatine and bichromates, but the application to a surface of stone or metal of the preparation, which it is stated may consist of gelatine, gum, isinglass, albumen &c., mixed with a solution of bichromate or "other liquid which possesses photographic properties," &c. It is, in short, a method of engraving which is patented, and not a discovery with which photographers were at the time familiar. This writer wonders to what purpose we alluded to the fact that various eminent writers—Hunt, and others—had credited Mr. Ponton with the discovery. Simply because they did it years before the date of Mr. Talbot's patent, proving the matter to be familiar to scientific writers at a time long anterior to that at which the *résumé* writer supposes the discovery to have been made. We have no need to remark that no dishonour to Mr. Fox Talbot has been or is likely to be done in these pages, which have been adorned by some of the best examples of his important discoveries in this very direction; but it is not honour to attribute to him the discovery made by another. There are one or two other matters in the strange *résumé* of photography in the recent number of the *Popular Science Review* to which we shall briefly advert, but we shall only do so because our own Journal is referred to in connection with them. In response to a charge of misstatement which appears has been made by the Reporter to the Jurors at the North London Exhibition, it is alleged as an excuse that the statements had previously appeared in the Photographic News and other photographic journals. This is simply not true. The series of offensive misstatements made in the October *Popular Science Review* were peculiar to itself, and never appeared in our own, or, so far as we know, in any photographic publication. Again, quoting certain remarks we made on the new periscopic lens, it observes that we "confessedly speak from hearsay." This also is wanting in truth; we do not write from hearsay, nor did we ever say we did. Our information on the subject was obtained direct from scientific correspondents on the Continent, one of whom had examined the lens itself. These matters are in themselves comparatively insignificant, and these misstatements by the writer in question not likely to do much harm; but we object to be named either as propagating or sanctioning error.

To Correspondents.

⁂ With each copy of the present number will be presented a copy of "A Mountain-Dew Girl: Killarney," printed by Mr. Woodbury's photo-relief process.

⁂ We are under the necessity of asking the indulgence of some of our advertising friends, whose announcements are compelled, from the crowded state of our advertising columns, to stand over.

Erratum.—In the advertisement of the sale of Mr. Stephen Thompson's business in our last, the amount of the valuation mentioned as £600 should have been £1,000.

Kent.—It is not by any means imperative that the sitter be placed on an elevation or platform; on the whole, we prefer the sitter on the same level as the camera-stand.

W. V. Snidoe.—A photograph on paper should receive a coating of size before varnishing. When this is dry, apply mastic varnish with a suitable hog-hair tool.

Frederic L. May.—There is no work published on the Wothlytype process; but full working details may be had on application to the Secretary of the Patentees, 213, Regent Street.

Dr Paul Liesegang.—Mr. Woodbury's address is Worcester Park, near Kingston-on-Thames, Surrey. The other address we will obtain and send. Thanks for the print enclosed. We have occasionally met with cases in which collodio-chloride prints on paper tone with difficulty. In such cases we find the *sel d'or* toning bath answer best. We shall be glad to see the examples of Dr. Schnauss's paper.

F. L. G.—The proportion of soluble cotton for a negative collodion will vary with the quality of the cotton. With some very soluble samples as much as 8 or 10 grains to the ounce may be employed with advantage, whilst with other samples 4 grains will be ample. With an average good sample about 6 grains will answer best. About 2½ grains of iodide of cadmium, 2 grains of iodide of ammonium, and about 1 grain of bromide of cadmium, will give good results.

Grace (India).—Thanks for the views in the Neilgherries; they are exceedingly fine; you need have no fear of their not being up to the mark; they are quite equal to the average of this country, and are, indeed, amongst the finest Indian photographs we have seen. The tone is exceedingly good, possessing the quality, rare in photographs, of warmth in the foreground and cool greys in the distance. The cracking of the film in the small picture is a trouble with which we are familiar. The immediate cause is generally damp and cold, or sudden change of temperature. The remote cause is generally imperfect washing after fixation, some traces of the hyposulphite or cyanide being left in the film. These salts, from their hygroscopic character, will absorb moisture if the negatives are kept in a damp place, and this will finally issue in the vermicular cracks seen on the small print. Sometimes the same condition may be induced by the washing water holding chlorides, carbonates, &c., in solution. There is no certain cure; but it has been found that, in some cases, if the cracked film is submitted to the vapours of alcohol, the cracked edges will re-join and print without showing trace of the injury. Rubbing a little fine charcoal dust over the cracked film sometimes prevents the cracks showing much in the print.

J. E. D. (Kent.)—A positive varnish may be made by dissolving gum dammar in benzole, in the proportion of from 30 grains to 40 grains per ounce. This may be applied without heat. Gum sandrach dissolved in alcohol makes a good positive varnish, a little harder than the preceding, but requiring the aid of heat. Copal is a troublesome resin to manage, altogether unsuitable for amateur varnish making. The actual production of photographs in natural colours is a fact long since achieved. The transcript in natural colours of the solar spectrum, by M. Becquerel, referred to in the *Athenæum* as a novelty, was produced many years ago. If you refer to the communication to our pages by Sir J. Herschel, a few weeks ago, you will find that he describes an example he has had in his possession for years. Three years ago we saw some very brilliant examples by M. Niepce de St. Victor in Paris. We received your former letter containing a kind explanation. Many thanks and reciprocations.

F. L. T. (Hampton Court.)—The distance necessary between the camera and sitter to produce an image of a given size will depend entirely on the focus of the lens. In producing a card picture, in which the size of the figure is generally on a scale of about half an inch to each foot in the height of the model, the distance should be, for a lens of six inches equivalent focus, about twelve feet. The negative for the card enclosed has been under-exposed and is not sharp, which is probably due to the movement of the sitter.

T. J. Miller.—The proportions you mention for a glass room "18 feet long and 20 feet wide," are rather odd. If 18 feet be the utmost you can afford for length, about 12 feet will be the best for the width. About 10 feet in length, of the roof, will be sufficient for top light. The side lights must be at least as long as the top lights. The card you enclose has many good qualities, and is a very creditable production for a "four-months' hand."

E. L.—Dr. Towler's work on the Dry Process is published in this country by Trübner, Paternoster Row. Its American price is one dollar. There is no work especially devoted to the subject of transparencies.

F. R.—We have seen examples of Mr. Swan's photographic engraving, which possesses much promise. We have not seen any of his photolithographs, nor has he at present, we believe, worked the process out practically. The best photolithographs possessing half-tone which we have seen, are some by Messrs. Simonan and Toovey, of Brussels; the best in line are by Mr. Osborn. There is no work devoted to the subject; but many articles have been devoted to it in our columns.

B. B.—If you add carbonate of soda to a nitrate bath to neutralize acetic acid, acetate of silver is necessarily formed; the same result follows the addition of acetate of soda to the nitrate bath. A double decomposition ensues, in which nitric acid leaves the silver for a base (soda) with which it has more affinity, and forms nitrate of soda; whilst the acetic acid driven from the soda attaches itself to the oxide of silver left by the nitric acid, and forms acetate of silver. The presence of acetate of silver favours intensity, but it often causes stains and insensitiveness.

L. M. P.—Colouring photographs in oil is not a difficult operation if you possess sufficient knowledge of drawing and painting; but of course some skill in this direction is necessary. The photograph should be sized previously to commencing, to prevent the colours sinking into the surface. If glazing colours only be used, the operation is comparatively easy, but the effect is neither so perfect nor so permanent as if the picture be painted in solid colours.

R. D.—You had better study a treatise on perspective. The terms "point of sight," "vanishing point," and "horison line," all refer to that point towards which all lines appear to converge in a landscape. If you stand on a level plain and look as far across the landscape as you can see, the earth and sky will appear to meet at a point level with your eye. This is the vanishing point. Read Mr. Werge's paper again. Pictorial backgrounds are not only commonly false in this respect, but in many others, and most of all in incongruity and impossibility of subject. We infinitely prefer a plain background to the majority of these absurd painted affairs.

Henry L.—Your negative is evidently thin and fogged, and no skill in printing will produce a brilliant print from such a negative. The pose is also awkward. Bear in mind that it is almost impossible for a figure to rest equally balanced on both feet and look easy and graceful. The weight of the figure should be thrown on to one leg to secure the effect of ease. 2. It is probable from your description that your collodion is old and insensitive. Throw it away, or use it to clean old plates with.

G. P.—Apply tincture of iodine to the silver stain, and follow this with a strong solution of hyposulphite of soda. This will readily remove a fresh stain.

Tyao.—The difficulty in getting your chloride of silver to precipitate probably arises from the use of too much water. The less water you can wash the prints with prior to toning the better. The fine particles of chloride of silver widely distributed through a great bulk of water subside slowly, especially if salt alone be added. A little hydrochloric acid will aid the precipitating. Excess of an alkaline chloride, used as precipitant, will keep the chloride of silver in solution.

The Advance of Wages Movement.—We have received another communication from Mr. H. R. Worth on behalf of the committee of camera-makers, on the subject of their claim to an advance of wages. Mr. Worth says that we have been misinformed as to the amount of their wages, which are not 15 per cent. higher than those of cabinet-makers generally. We of course know nothing of the matter but what we have been told, and our information was received from employers. He adds that as they have no trades' union their wages are regulated by the law of supply and demand, and their higher wages must necessarily be the result of their production of articles of higher market value. This is perfectly true, and it was for this reason that, when we understood a strike was imminent, we recommended the men to pause before, by withdrawing one supply, they gave occasion for the creation of another supply, and thus permanently reducing wages. We regret that the limits of our space will not permit the discussion at length in our columns of a subject not important to the majority of our readers. We can only hope that the matter will end amicably, and if it issue in employers seeing that they can afford, without injustice, to acquiesce in the desired advance, it will afford us pleasure to know that a skilful class of men are sufficiently remunerated.

J. L. W.—The fluted side out. We posted an answer to your letter as soon as we received it.

Dr. Vogel.—The specimens received. Regarding the translation of article in No. 20, yes: thanks.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

Vol. X, No. 387.—*February* 2, 1866.

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PHOTOGRAPHIC SECRETS.

A discussion appeared some weeks ago in our columns between Dr. Anthony, a cultivated and able amateur, and M. Silvy, well known as a distinguished professional photographer, which, although personal in its origin, we cannot regret, inasmuch as it elicited much that was interesting and suggestive. The real question which underlay the personal matter was, how far are photographic secrets legitimate or justifiable, and what is their effect upon the advancement of the art? Dr. Anthony, referring to the exquisite results in photographic enamel of M. Lafon de Camarsac, regretted that he kept secret the method by which such perfect results were produced. M. Silvy, as the friend of M. Camarsac, resented the imputation of reticence, or any suggestion of blame attaching to it, and maintained that as that gentleman was prepared to produce enamels for all who offered him commissions, he served the art better by producing good results, at reasonable rates, than by making known his process, which, falling into less skilful hands, might produce worse results, and thus injure instead of serving the art. We desire to state this proposition most fairly, because, if true, it is a general proposition capable of wide application, and because we believe, on the most liberal construction, the proposition is a narrow one, and that its application would materially retard the progress of photography.

An examination of the subject naturally divides itself into two parts; a consideration of the effect of art secrets on the progress of art as a general question; and next, the special bearing of such secrets on the art of photography. We can only glance at either aspect of the question, and very briefly suggest a few considerations on the subject.

We shall not attempt to deal with the ethical question of the right of any member of a community to keep secret anything which might tend to the good of the community; but we may suggest a comparison between the advantages gained by the community by an art being kept secret, and the disadvantages involved in such secresy. The sole advantage gained—and we admit that in many cases it is a definite advantage—is, that the owner of a secret possesses a monopoly which remunerates him for extraordinary care and pains in working his art, so as to secure the greatest excellence in every example of it. Not being subject to any ruinous competition, he is not induced to scamp any portion of the work to secure rapidity of produce or lowness of price. Being sure of all the honour belonging to such work as the sole producer and possessor of this secret method, he has a reputation to maintain; whilst if the secret were made public, no one would have the same motive to excel in the art. Or a host of incompetent men might attempt to work it, and not only injure it by a cutting competition, but degrade it by worthless productions, the common result where competition aims to cheapen price rather than improve quality. This is the strongest mode of putting the argument. Against this is to be placed the tardy progress the arts must make if every discoverer retained his own secret, and the inevitable and actual loss which must frequently occur. There is a sad significance in the familiar term the "lost arts." These are the illustrations of what actually has occurred in the history of civilization. Dr. Anthony referred to some examples of loss in the ceramic art, the "crackle" and "lustre"; to these might be added others in oriental porcelain, and colours formerly produced in the Sevres ware. In painting, notwithstanding the progress of science and the excellence of modern colours, we cannot reproduce the permanency in either pigment or vehicle of some of the old masters. In dye-stuffs the same is true; Tyrian purple, and some other colours, are now only known by name. That we have admirable substitutes for the arts which are lost cannot be doubted; but the fact remains, that something—possibly much—is irrecoverably lost, and that such loss is often due to the careful guard which was kept over the secrets, which at length perished with the holder.

That the maintenance of such secrets retards improvement cannot be doubted. It is a mere truism to say that the progress of mankind has depended entirely on the fact that its improvement is cumulative, and that accumulation depends upon one generation recording its discoveries for the benefit of another, one commencing where another left off. The Government, in recognizing a limited property in ideas, has essential regard to the destruction of secresy, because of its baneful effects on progress. It grants a monopoly for a limited period to a discoverer on the express condition that he fully disclose at once all he knows on the subject he secures for the public benefit. The public may not infringe his patent rights during the period of their existence, but any one is at liberty to improve upon the discovery or invention, and thus, by its publication, a stepping-stone to further progress is secured. A secret process held by one mind can rarely fructify; but when published it may become the germ of great improvements in others. And whilst it is true that competition, by aiming to surpass in cheapness, may injure, it is not less true that competition, by aiming to surpass in excellence, may immensely improve an art.

But if it be true that the maintenance of secret processes is unjustifiable and injurious in the arts generally, it is pre-eminently so in photography. All the traditions of the art protest against it. The fact that the growth and progress of photography are almost without parallel in the history of art and science is due to the united efforts of many minds, all thrown, as by one general impulse, into the treasury of the commonwealth of photographic knowledge. Some of the names which will add lustre to the history of this age, by their contributions to almost every branch of philosophy and science, have been foremost in shedding light on the science of photography; whilst the humblest operator, by carefully watching, and honestly recording his observations, has contributed to the advancement alike of theory and practice. And—we say it without hesitation—there has not been a single discovery, great or small, in connection with the art, after the announcement of certain foundation facts by men who have kept no secrets, the discoverer of which has not been largely indebted to the labours of his predecessors; and the preservation of secrets, based upon knowledge received gratuitously, has in it something of meanness and ingratitude, if not of absolute dishonesty to the art.

We are disposed to go further, and affirm our conviction that no one ever really profited by the maintenance of a secret in photography. Excellence in the art is not the result of exclusive knowledge so much as exclusive skill. Who are the men who have made names, and some of them fortunes, by excelling in their several departments of the art—such as Mudd, and Williams, and Mayall, and Robinson, and Claudet, and England, and Rejlander, and Hughes, and Blanchard? Are these the men who have preserved secrets? Are they not, on the contrary, those who have always most freely contributed information to all who have asked them, giving as freely as they have received? We speak with no disrespect of M. Camarsac, merely using his case as an illustration, nor with any disrespect of M. Silvy, for whom we have the highest esteem, and whose warm advocacy of his friend wins our admiration; but we do not believe that if M. Camarsac were to publish the details of his method to-morrow, he would receive one commission less in the years which are to come. He might communicate the secret of his knowledge; he could scarcely communicate the secret of his skill, on which we believe his pre-eminence mainly depends. He would certainly gain honour for his liberality in communicating knowledge, and we do not think it probable that he would lose one sous of the income so well earned by his charming productions, for which the demand would not be likely to decrease because the secret of their production was made known; nor would it be lessened by any competition save one of superior excellence, a thing we can scarcely believe possible.

On this subject there is one word to be added on patents. There are many cases in which we maintain the right and desirability of a discoverer to obtain a patent. Of course there are cases in which it is neither right nor desirable. But in any case it is, we conceive, better for the community that a discoverer should secure a monopoly by patent than by the maintenance of a secret. When a patent is granted, the fullest particulars of the discovery or invention must be made public, and it may thus become germinal, and improvements may follow; whilst the secret is a miser's hoard, conferring a doubtful benefit on the owner, and none on the community.

It is not our purpose here to enter into a defence of patents; but we may explain what we mean by saying that in certain cases they are desirable. Apart from the right which an inventor has to endeavour to obtain some specific profit from the time and money he may have spent in perfecting his invention, there is another consideration of importance to the public. In many cases an invention or discovery can never yield valuable results until a good deal of capital and time have been spent in bringing it into a working condition. If it were thrown open to the public, no one would probably feel at liberty to invest the necessary time and money in bringing the invention into a working condition if he had the full certainty that the results of his labour would become public property; whereas, with the monopoly for a limited period which a patent gives, sufficient remuneration might be obtained to justify the outlay necessary to bring the invention usefully into the hands of the public. In such case it is clear that the patent secures public benefit as well as private profit. This is an end which could under no circumstances be secured by the preservation of a secret.

Critical Notices.

PHOTOGRAPHIC MOSAICS. Edited by M. Carey Lea and Edward L. Wilson. (Philadelphia: Benerman and Wilson.)

This little volume is a collection of articles, original and selected, on photography, edited and arranged by M. Carey Lea, whose name is already so well known on this side of the Atlantic, and Mr. Wilson, who is the editor of our excellent contemporary, the *Philadelphia Photographer*. The selections here are from various sources, many being quoted, with due acknowledgment, from the English journals. In one or two instances—from oversight, no doubt—articles from our own pages have escaped acknowledgment. The great purpose of little manuals like this—a purpose which we recognized when we first initiated the practice in our Year-Book—is to place the matter important for constant reference in a compact and accessible form, without the necessity for searching through the matter of bound volumes of the journals. The time saved alone is worth far more than the price of the little hand-books which such selections form. As we have said, the matter in this is varied and full of interest. Here is an example from the pen of Mr. Lea, whose advice on this subject has not before been placed under the eyes of our readers:—

ON THE MANAGEMENT OF WASTE NITRATE OF SILVER.

If photographers do not know how to manage their waste silver solutions, it is certainly not for want of advice on the subject, but rather, probably, by reason of too much contradictory counsel.

I do not expect, in these paragraphs, to develop anything in the least new, for all the methods rest upon a few principles, well understood amongst all chemists and assayers; but it is convenient to have a few simple rules with respect to the carrying out of these principles, so as to accomplish that saving with as little trouble as possible. Some will not take any trouble, and waste all their silver, probably not knowing how easy it is to save it.

The directions which I am now about to give are applicable rather to the operations of amateurs who work upon a moderate scale, than to professional workers, and it is to the former that they are addressed.

Divide your waste solutions into three classes, viz.:—

1. Solutions containing hyposulphite.
2. Weak solutions free from hyposulphite.
3. Strong solutions free from hyposulphite.

The first of these of course includes solutions used for fixing both positives and negatives.

The second consists of the first washings of printed proofs. It is scarcely necessary to say that the only proper way to treat proofs is to let them rest fifteen to twenty minutes in a very moderate quantity of water, which is to be saved; the further washings may be rejected.

The third class consists of negative baths, that can be no longer persuaded to work, of positive ammonia; nitrate baths that have become choked up with nitrate of ammonia and organic matter from the paper and albumen, and will no longer yield to the action of citric acid or kaolin; and of plain nitrate baths in a similar bad condition.

Provide three capacious bottles to accommodate these different classes.

1. In the first, place strips of sheet copper, and let the sediment of precipitated silver settle to the bottom. When your bottle has become full, and the last additions have remained twenty-four hours in contact with the copper, pour the liquid out and add new portions. When your silver has attained a quantity sufficient to make it worth while, you remove it, and work it up with the rest. You may leave this as long as you like, only taking care always to have plenty of metallic copper present.

2. The bottle into which you pour your weak solutions is to be managed differently. It will fill much faster than the other, perhaps daily, and is best regulated as follows:—Throw a tablespoonful of salt into the bottom of the bottle, pour in your waste, stir up, and in a few minutes the chloride of silver will settle. When you have more ready, and the bottle is full, pour it off, and add another spoonful of salt. Keep a few lumps of zinc in the bottle, and once in a while add a few drops (*very* little is sufficient) of sulphuric acid. This will save you from the trouble of working up your chloride as a separate operation. Instead of your silver accumulating in the form of chloride, you will have it ready in the form of "revived silver," as the assayers express it.

3. The bottle containing the spent baths will accumulate more slowly, but be much richer in silver than the other solutions. It

is not worth while to convert this into chloride at all. Keep some lumps of zinc in it, acidulate faintly, and the silver will all fall down.

The object, in the second instance, of converting into chloride is simply to save time, inasmuch as the silver is removed far more quickly in this way than the other. But if the photographer prints only once in a while, so that his spent solution has a chance to remain several days with the zinc, he may combine classes 2 and 3. and dispense with the salt altogether, reviving his silver directly, instead of first converting into chloride.

The great advantage of converting into chloride lies in that the silver is thus purified from almost any admixture with other metals. There is scarcely any insoluble chloride, except those of lead and the protochloride of mercury (calomel); so that if the amateur is in the way of making original experiments, in which his silver solutions become mixed up with a variety of other chemicals, a bottle for chloride is very convenient.

In the case of old negative baths, it is true that they become contaminated with the nitrates of various metallic oxides. But the only one of these which is precipitable by zinc is *cadmium*, and its presence is very far from being important enough to take special means to get rid of it.

By the foregoing means we have recovered all of our waste in the form of metallic silver, in a state of extremely fine powder. A few words as to the best disposition of this will probably not be out of place.

The silver powder must first be thoroughly washed by placing it in a capacious vessel, and stirring it up with a large quantity of water, then allowing it to settle, and pouring off the water. This is to be repeated at least six or eight times.

The next step is to dissolve it in nitric acid. And here a little care is necessary. This powdered silver acts very treacherously. You mix it with dilute nitric acid, and no action takes place. You set it in a warm place, and when you return, as likely as not, a violent action has set in, and your solution, although at the bottom of a deep vessel, has frothed over the sides, and wasted a large portion of material.

A convenient method is as follows :—Put a little strong parting acid at the bottom of a large vessel—much less acid than you know you will require. Add some silver. A violent action will ensue. Add enough hot water to moderate, but not stop it, and more acid and silver, and so keep the action going on rapidly, but regularly, which you will find it very hard to do, if you either put all your acid into the beaker at once, adding silver by degrees, or all your silver, continuing to add acid by degrees.

The solution thus obtained will be strongly acid. Filter it, and fill a four or five ounce Berlin porcelain capsule with the filtrate. Place the capsule over a Bunsen's burner, and add more solution as evaporation takes place, until all your solution is added. When all the silver nitrate remains as a hard crust, gradually turn on the heat of the burner, until you fuse your nitrate, which you may thus easily and conveniently do, without changing it from the vessel in which its solution was evaporated.

The nitrate of silver thus recovered from waste is by no means a poor quality, only fit to be used up for positive printing. On the contrary, it is excellent for negative baths. At the time of writing, the only two negative baths which I have in use were made from nitrate of silver prepared and saved in precisely this way, and better baths no one need wish to have.

A word remains to be said on the subject of *acidulating*. Most collodions require a faint acidity of the bath, but the utmost care is requisite to avoid adding too much. Putting a glass rod into a nitric acid bottle, and stirring the bath with it, as some do, is a most clumsy way, and introduces a great deal too much—several drops at once. The best way is as follows :—Put 4 ounces of distilled water into a stoppered vial, and drop into it 64 drops of pure nitric acid. Each half drachm will then contain exactly one drop of the acid. When you mix your bath with the crystallized nitrate, you may find your collodion work well with it at once; but where fused nitrate is used, acidification is apt to be required. To a 25-ounce bath, add a half drachm of the dilute acid—that is, one drop of nitric acid—and try a plate. If it fogs, add another drop, and try again. In the last trial which I made, a 20-ounce bath of fused nitrate required just 2½ drops of nitric acid to make it work right.

Finally, I suggest that when a bath ceases to work well, it is not worth while to waste much time in coaxing it. Success is doubtful, and if a single trial or two does not succeed, it is better to turn the bath into a bottle, No. 3, as before described, and make a new bath, *ab initio*. It is no waste of material, and a considerable saving of time and patience.

THE WORKING MAN ; a Weekly Record of Social and Industrial Progress. (London : Cassell, Petter, and Galpin.)

We commend to our readers this most promising of all the journals we have seen designed to elevate and cultivate the industrial classes. The important contributions in science and art alone entitle it to the attention of photographers.

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The Old Photographer Apologises—Diamond *v.* Sutton—Museums for National Portraits—The Presentation Print—Backgrounds—The New Developer—Mechanical Power from Sunshine—Alkaline Development—The Societies.

In the last "Echoes," when commenting on the return of pictures from the Dublin Exhibition in particular, and all exhibitions in general, I was a little precipitate in my remarks, and should have waited a short time longer before I complained of the time that elapsed between the close of the exhibition and the return of specimens, as I find that the long-expected contributions were returned to their owners a day or two after my remarks were published. The facts were as I stated, and if the secretary had answered my letter all would have been well; but I had several reasons—perhaps erroneous ones—for supposing that the authorities were in no hurry to return the photographs. Probably the secretary thought that the few miserable little specimens I had sent were not worth his troubling himself about, and on calm consideration, I agree with him. As far as I am personally concerned, my greatest regret is that some remarks I intended for the negligent secretary might be taken as applying to a gentleman who has been the reverse of negligent throughout the whole exhibition—I mean the manager of the photographic department, Sir Joscelyn Coghill—a gentleman for whom I have, personally, the highest esteem and respect, and who, by his excellent management, made his department of the exhibition one of the most attractive there, and who, for his energy in obtaining a place for photography as one of the fine arts, deserves the gratitude of all its followers. One of the greatest luxuries a gentleman can feel is to apologise heartily when he has given the least cause of offence: "To err is human—to forgive, divine." The "Old Photographer" has been the former, and he asks Sir Joscelyn to be the latter.

So it seems that it is considered safe in Jersey to libel or malign an Englishman. It is only necessary, after throwing your dirt, to dodge round the corner of the law, and cry out "No jurisdiction!" in order to escape punishment, or, at least, render it difficult to administer. This is, at least, the conclusion at which I arrive on reading a paragraph in the law reports in last Friday's morning papers, which runs as follows :—

DIAMOND V. SUTTON.

This case presented a point of some novelty.

Mr. Griffiths applied, on reference from Mr. Baron Martin at Chambers, to set aside a writ of summons issued in this case, under the 18th section of the Common Law Procedure Act of 1852. The action was for a libel appearing in the *Photographic Notes*, a publication which is published and printed in the island of Jersey, and whereof the defendant, Thomas Sutton, is the admitted editor. The plaintiff, Dr. Diamond, is, or was, the editor of the *Photographic Journal*, and the principal charge against the defendant is, that in his publications of the 1st and 15th of November last he declared that the plaintiff, as one of the jury at the North-Eastern Photographic Exhibition, which had been recently held, awarded a medal to a particular exhibitor because, at some time or other, he (the plaintiff) had been pressed for the payment of a sum of money by a rival exhibitor. The learned counsel admitted that the defendant was the writer of the articles complained of, but he maintained that no cause of action had arisen against him within the jurisdiction, and, therefore, that the learned judge at Chambers had properly abstained from permitting the plaintiff to proceed.

Baron Martin: I offered to let the writ stand if the plaintiff would give an undertaking to confine himself to causes of action which had arisen in this country.

Mr. Day, on behalf of the plaintiff, submitted that it was abundantly plain a cause of action had arisen within the jurisdiction. True, the defendant was but the editor of these *Photographic Notes*, but the publication was avowedly published and printed with a view of being mainly circulated in England, and indeed, in the terms of one of the libels complained of, the *Photographic Notes* was described as the only independent journal of its kind circulating in this country. Acting, therefore, upon the accustomed practice, the learned judge at Chambers ought to have been quite satisfied with the *primâ facie* evidence, and to have allowed the writ, without tying down the plaintiff to the limits prescribed.

Ultimately the Court ordered the matter to stand over, to ascertain if the plaintiff was willing to enter into an undertaking to offer proof that the cause of action had arisen within the jurisdiction: otherwise the writ to be set aside.

The action in question arises, I presume, out of the imputations cast in the periodical in question on Dr. Diamond's private character, and alleged as prompting him to unfair and dishonourable acts in his public life. How far the attempt to evade jurisdiction will succeed time will show.

Two or three years ago Mr. Lachlan M'Lachlan, of Manchester, suggested a promising scheme for transmitting the "counterfeit presentments" of our famous men down to posterity; it was not taken up at the time, and apparently dropped out of sight. His plan has now been adopted by the Corporation of Manchester, and will, I hope and believe, be carried out in a manner worthy of the great object its originator has in view. The intention is to collect photographic enamels, or other permanent photographs, of the "Men of the Time," and to preserve them in a museum established for the purpose. To effect this, photographers are requested to lend any suitable negatives, or transparencies from them, they may possess, to the Corporation, who will cause enamels to be made from them by "the process of M. Lafon de Camarsac, or by other similar methods."

Here is my one objection to the scheme—that the enamels should be sent abroad for execution. Portraits of Englishmen taken for a national object should be produced by Englishmen. This ugly blot on the prospectus could probably be altered. At all events, the "Old Photographer" must insist that *his* portrait be not sent out of the country for this purpose; he has too much faith in the powers of his countrymen.

Let us be serious.

Now the scheme is fairly afloat, Mr. M'Lachlan is prosecuting it with great energy; he has applied to many photographers for the loan of negatives, and has had abundant promises of aid, and only one refusal. The great men said, "Take all I have, and welcome;" the little man, who had only one negative fit for the purpose, said, "And what are you going to pay for the use of it?" It might be true that photography is the photographer's business, but there are occasions when strict business considerations may be relaxed in view of larger purposes, and this is one of them.

Photographers generally—for of course photographers generally take the News—are now familiar with the results of Mr. Woodbury's photo-relief printing process, the greatest achievement in photo-mechanical printing which our art has effected, and tried in the presentation print just issued on a most difficult subject, for nothing tests the capability of a process to render half-tone like the human face. It is a rather serious business for a man who is the sole master of the working details of a process to have to produce prints by thousands, as Mr. Woodbury has had to produce the Killarney Girl. I understand that he is hard pressed by applications from other journals for illustrations of his process, and, when he has recruited a little after his late exertion, is about to re-commence on another task, happily somewhat lighter than his last, which will show the working of his process on an entirely different and somewhat easier kind of subject. In this instance he will undertake the office rather of instructor and superintendent than of "pressman," as I understand he is about to initiate one or two assistants into the working details, who will try their "'prentice hands" on the prints next to be issued. The prints which have reached the hands of the readers of this Journal, besides being the first issued, will have the additional interest, I thus glean, of being probably the only series printed by the hands of the inventor. I think it is matter of congratulation that the company, who it is understood have acquired, or are about to acquire, the patent, will issue licences, and that all who are anxious may be enabled to work it. How curious it is, by the way, that nothing great or good was ever discovered but it was immediately proclaimed by somebody to have been discovered before by somebody, from whom it has been "appropriated." The fact that those claimed as the original discoverers had never mentioned their discovery does not seem to prevent some people from making charges of "appropriation" on their behalf against the undoubted discoverer and practical worker-out of the invention.

A few papers such as that read by Mr. Werge on "Errors in Pictorial Backgrounds," before the South London Society, would do good service to our art. With the exception of a paper by Mr. Blanchard, read at a previous meeting of the same Society, I do not remember any paper on "art" in photography, read before a Society, containing any sensible remarks, for a very long time. Mr. Werge very pertinently says, "'Apply the rod to teach the child,' is an old saying, and our artist friends and teachers *have* applied the rod and belaboured photography most unmercifully; but they have *not* taught the child. They have contented themselves with abusing photographers for not doing what is right, instead of teaching them how to avoid what was wrong." Some writers on art as applied to photography have been a great deal too vague in observations on the subject; they teach nothing. Rhapsodies and yearnings may be very pretty and poetical, but they are very unmeaning and useless. Aladdin speaks the sentiments of these writers when he says in the pantomime—

> "But I've a soul which spurns whate'er is real,
> And longs for—*you* know what I mean—the ideal:
> Throbbing with impulses fond, faithful, dutiful,
> But seeking out the big, the bold, the beautiful!"

To return to backgrounds and Mr. Werge. It is certain that the majority of these things that are supplied to photographers at present are simply ludicrous in their deviation from nature. Mr. Werge has confined himself to pointing out one error that may be observed in nearly all—that of perspective. To exhibit false perspective in a photograph is reversing the well-known line, and proving that—

> "What's impossible *can* be."

The excuse of the background manufacturers is, that the public prefer bad backgrounds, a proposition I will not endeavour to combat. However, I would recommend photographers, until they can get something different to what is supplied them at present, to use plain backgrounds, or to paint their own; in fact, "Paddle their own canoe."

I had promised myself that I would never mention the new developer any more; but what am I to do, when three important members of the Photographic Society insist on reading three papers on the same night on the subject? Mr. Jabez Hughes and Mr. H. Cooper, jun., gave "further observations," which were undoubtedly interesting, and on the subject of nomenclature I heartily endorse Mr. Hughes's remarks; but Mr. Nelson K. Cherrill read a paper which for acute reasoning, thorough knowledge, and clear exposition of the chemistry of the new developer, has not been equalled since the time when Mr. Hardwich's voice was so often heard in the Society. Mr. Cherrill is a new member, and will, I anticipate, be a great acquisition to the Society.

Still, notwithstanding all this talk about the new developer, personally I have little faith in it for ordinary purposes. I think our Editor rightly summed up its value, and put it in its proper position, when he said, that what may be medicine to the sick, may be poison to the healthy. I think this explains how useful the new developer is to those who are often in difficulties with their chemicals, and how retarding it is found by those who know the proper use of ordinary iron developer, and a nearly neutral nitrate bath in a healthy state.

The extraction of sunbeams from cucumbers was once proposed as the object of a company. This scarcely sounds more absurd than "obtaining mechanical power from sunshine," as appears to have been done lately in France, an account of which was published in a recent

"Talk in the Studio." But the prosaic science of this day transcends the wildest imaginings of poets a century ago.

A discussion on who was the discoverer of alkaline development has been carried on with more or less liveliness for some seven or eight months. I have always felt fully convinced that the first who practically discovered and recognized the fact of alkaline development was Mr. Thomas M. Leahy, of Dublin. This I have steadily maintained in private; but the other claimant of the process has been so persistent in his claim, and Mr. Leahy has been so unaccountably silent during the discussion, that I almost began to waver in my opinion (a most unusual thing, by-the-bye); but it turns out that Mr. Leahy has been from home for months, and has not seen the journals; he has now turned up, and settled the matter very clearly and satisfactorily to the minds of all unprejudiced persons; but he nearly lost the honour of being the first to practise this process, which shows what a misfortune it is not to receive your "News" regularly.

The time of the Photographic Society at the last meeting was entirely occupied with the new developer. The chief feature at the meeting of the North London Association was the distribution of the Presentation Prints, worth more than the annual subscription. At the South London Society, Mr. Werge read the paper I have already mentioned, and Mr. Dallmeyer made some remarks on the new periscopic lens, in which he proved so much more than I can summarize here, that I must refer the reader to his remarks. It seems, as our Editor some months ago intimated, the new lens is not achromatic, but can be made approximately so by using something like a pin-hole stop, a condition which those who like plucky pictures, or who introduce figures into their landscapes, will scarcely like to accept.

Nothing of any interest has taken place at the Provincial Societies during the month, and a dry list of their proceedings would be very dull reading. My usual informant was absent from the meeting; but from a report of the proceedings I have read, the members of the Glasgow Association appear to have curiously misunderstood Mr. Woodbury's process, and mixed up metal moulds, electrotypes, gelatine impressions, gutta-percha, collodion, &c., in wonderful confusion. This is the more surprising, as nothing can be simpler than the manipulations and the descriptions of the process which have been published.

The next meeting of the South London Society, according to the announcement at the last, will be one which all who can find admission should attend. Mr. George Wallis, of South Kensington Museum, will deliver a lecture on "Art as applicable to Photography," with illustrations on the black board. Mr. Wallis's name is a guarantee for the interest and value of the information which will be given.

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A THREE DAYS' PHOTOGRAPHIC TOUR.

BY A NORTH COUNTRY PHOTOGRAPHER.

I have several times noticed, in the News, descriptions of tours by various contributors, which, however interesting as itineraries of the parts they have visited, appear to me, with all deference to the writers, to be very deficient in *photographic* incident. I think that in the News photographers would read with more interest of the purely photographic part of the journey—of the failures and successes, and what led to them; or of the working difficulties in which others had been placed, and the shifts by which they were overcome. Perhaps some of the information thus conveyed might prove valuable to the reader in his own out-door work. With these ideas in view, I purpose to give you an account of a three days' journey spent in taking views of some of the beautiful scenery along the Newcastle and Carlisle Railway, principally near Naworth Castle and Gilsland. Regular routine work I intend pretty much to skip over.

I may premise that the views were 10 by 8 and stereo, and that I work the wet process only. My tent and all the apparatus pack into a box fitted on wheels, so that wherever the train delivers me I am able to set off at once myself, quite independent of any assistance.

Leaving Hexham by the first train in the morning, I was early at Naworth station, and as the mist was heavy, I left my carriage standing on the platform, and took a walk to a hill a short distance off, to see if there was much worthy of attention beyond it, and to give the sun time to brighten things up a bit. On my return I found a group of porters and their friends standing round a strange-looking piece of iron work, left for some one in the neighbourhood by the train in which I had come, and discussing what its use might be. I gave my assistance also to the enquiry. Very well finished and very intricate it looked, and evidently the maker had some definite object in view, but there was an end of the matter to us all. "It looks a curious affair," I remarked, turning to what I thought my own straightforward articles. "Aye," replied a porter, "that's just what we've been saying about them things of yours; what may they be for, if you have no objection to tell us?" I gave the desired information, and, standing in Scott's classic border land, I thought the incident was strongly illustrative of the line in the *Lay of the Last Minstrel*, "Use lessens marvel;" for the iron complication, like my apparatus, was doubtless a simple article enough to the man who had to use it, though puzzling enough to a stranger. I wheeled my apparatus down to the Castle, and set up my tent under the shade of one of the large elm trees, with a spring of clear water close at hand, into the runner from which I put the end of my waste pipe. I first tried a stereo picture of the main gateway, but on developing it stains appeared round the edges of the plate of a shape which showed that the developer had not mixed freely with the silver solution of the bath. To remedy this I added a little spirit to the developer, and tried another plate, with the same result. The morning was still raw, and it occurred to me that the coldness of the different solutions might be the reason why they had not mixed so readily as usual. When I took the next plate out of the carrier I ran over it two or three drachms of distilled water, returned it to the glass, added the developer, stirred well, and then developed with the mixture. Whether my idea was correct or not, this proved an effectual cure, and on discontinuing it some time later in the day, when the sun had been shining on my bottles for a while, the stains did not return.

After taking views of the main features of interest about the Castle, I looked out for an effective picture of the whole. At the east of the Castle is a deep dingle with a small stream running along the bottom. About a hundred yards up this I found what I wanted; two or three large boulders, an old tree stump, and a few ferns made a good foreground; then a rustic bridge over the stream, and beyond this some boldly shaped trees, made a frame in which was set Belted Will's Tower—the Keep of the old Castle. I brought my stand down to the place, and then found I should have some difficulty in fixing it so as to take in what I desired. It required to be high, to look over a bank I did not want, and it required also to look up to reach the tower, which stood high up on the bank beyond. When placed in this position it had far too strong a tendency to fall back upon me to make me willing to risk the camera upon it. I tried propping in various ways to little purpose, and was about to shift my ground, when a drainer, carrying a spade, passed on his way to dinner. Borrowing the spade, I made a hole, in which I firmly sank the back legs almost close together, and raising the front leg to the required height, I tied it through the handle of the spade driven into the bank. Thus fixed, I got some good pictures, which alone seem likely to repay me for the journey. I then pushed on to Lanercost Priory, about a mile further. This is a fine ivy-grown ruin, part of which has been repaired to use as the parish church. On coming in sight of it I was glad to find that I was to have company in my work, for a photographer's tent was standing near the shaft of a broken cross. Just as I got to the place the photographer was emerging from it with a face that told at once that all was not going well with him. Such I found, on enquiry, to be the case. He had exposed plate after plate only to find one worse than another, and was abusing his outfit as being the cause, and worthless, and vowing vengeance on the party who had supplied it. The outfit seemed little in fault, if Dallmeyer's name could be taken as any guarantee for a pair of lenses and a highly finished camera; tent, camera, chemicals, all seemed quite new, and on enquiry I found that this was the owner's maiden attempt at out-door work, his previous practice having been confined to a lesson when he purchased the apparatus. "But you know," added he, "the thing's as simple as can be; there's no getting far wrong." I looked at some of his pictures, and found they displayed a depth of badness beyond anything I had seen before—so bad that I should have felt at a loss how to produce such rubbish, and had to turn to the maker for an explanation. A few questions brought out the fact that he had been told, that in order to make the developer run smoothly, he should pour it with one sweep out of a glass, not from a bottle; and he had argued, if the developer, why not the collodion also?—it should be smooth as well. Reducing his theory to practice, he was alternately pouring from the same glass collodion and developer, without any process intervening that I should have called cleaning; and the remainder of his arrangements were on a par with this one. I exposed a plate in his camera, and developed it in his tent, to convince him that they were all right; but with chemicals that had been through his fingers I declined to meddle. As a cure, I prescribed a few weeks' practice in his own garden before he set off on another tour. With a few views of Lanercost I made my way back to the station, and took the train to Gilsland, where I proposed staying for the night.

Early next morning I set off to the valley of the Irthing, to a large boulder known as "The Popping Stone," from the tradition that here Sir Walter Scott was sitting when he popped the question to his future wife. The stone itself, with a few trees with which it is surrounded, is a good subject, and there are several other good bits in the deep dell in which it is situated. Whilst I was preparing, a party of ladies and gentlemen, who were staying at the Spa, came up, and on my focussing the stone, they rushed to secure places in the most approved theatrical popping positions. Once or twice this was well enough, as they gave me some rather ludicrous pictures; but when they insisted on forming a part of every picture I took, it became a nuisance, and it was only by making a feint of packing up that I could get rid of them. Finished here, I moved further up the stream, to obtain views of the waterfall. The track was so bad that I had more than once to unpack my articles and carry them forward separately, so as to get over some part where the rough bed of a stream was the only road. The fall, though fine in some respects, did not repay the trouble of reaching it, for the two views I got had not much point about them. Returning by another road, I passed an old cottage with a broken garden hedge and a few trees, and ferns on the hedge, ferns on the trees, ferns on the roof, ferns, in fact, everywhere—no wind—a first-rate little picture. I went inside to see if any of the inmates would match the dwelling and complete the tableau. An old woman was sitting by the fire in a high-backed chair, and just as picturesque as the cottage. By way of introducing the subject without producing alarm, I commenced drying my plates and talking about them, and finding some interest excited, asked the old lady whether she would like to be taken, telling her I could soon do it at the door. "Nay, nay," she replied, "I'se not fit to be ta'en, but I want Jenny, she'll mak' a bonny pictur'. Jenny, Jenny," she sung out; and in answer, a raw, clumsy lass appeared, quite sufficient to spoil cottage, grandmother, ferns, and all. "Well," said I, "come to the door and see it done." This she was ready enough to do, and sat down upon the stone settle by the door, with a look of intense interest on her face. I placed the younger beauty nearer to me, and so much on one side as to be out of the line of view. Telling the grandmother to be still for fear of making the other move, I exposed a plate and got a capital picture of the cottage and its appropriate inmate. As one good turn deserves another, I took a negative of the lass also. Unfortunately, I was not there to hear the remarks when the post delivered a copy of each.

When packing up, a gentleman who was passing—one of that class who know all about everything—volunteered his assistance, and the result was, that in putting my bath into its place he contrived to break both my dippers. Here, I thought, was the finish to my work, for I did not see how the want was to be met in this out of the way place. However, taking a stroll after tea, I fortunately met with a man who followed the trades of itinerant glazier and razor grinder. My broken dippers immediately occurred to me, and I thought that I would try to find a substitute. I got a strip of glass 2 inches by 15, and one ½ an inch, and one ¾ by 2 inches. I roughened the sides of the smaller pieces, and about ½ an inch of the bottom of the larger one, on the wheel. With the aid of a little liquid glue, which I always carry amongst my stores in case of any small mishap, I fixed the ½-inch piece close to the end of the long strip, and above it the ¾-piece. The three were bound firmly together with packing-thread soaked in the glue. The contrivance answered so well that I have used the same make ever since. Giving the glue plenty of time to harden is of importance, otherwise the bath soaks into it and loosens the glasses. I generally make three or four together, leaving them for a few months before use, and get them for 1d. instead of 1s. 6d.

Next morning I moved a couple of miles up the line, to the ruins of Thirlwall Castle. Whilst developing one of my plates, I heard two men come up, who walked round and round my tent, apparently in silent wonder. Presently they began to discuss whatever could be going on inside: one, judging from the camera, inclined to the idea that I was going to exhibit a peep-show; the other was in favour of my being a toffee dealer, for the manufacture and storage of which he seemed to think my apparatus was admirably adapted. In a neighbouring field the process of sheep-shearing was going on. I went over to the place, and found the men very ready to allow me to take a picture of them. I had some little difficulty in preventing them from rushing off for their Sunday clothes, which, they insisted, would vastly improve the picture, and be "ne fash avah" (Anglice, "no trouble at all"). The first plate was spoiled by the dog and some of the sheep moving; with the second, I tried a plan which I have seen recommended in the News, and which answered well. Just before taking off the cap of the lens, I blew a shrill whistle on a key, telling the men this was to be their signal for keeping quite still. The sheep started into life-like attitudes, which they retained two or three seconds; the dog eyed me very much as though he doubted my authority for sounding such an alarm, but he fortunately took no active measures to bring me to order. From this place I went to a range of low hills, to obtain views of the old Roman wall which runs along the top of them. Right in front of the wall there is an abrupt fall in the rock of some 12 to 20 feet, so that I could not get a stand for the camera, from which anything but a very profile view of the stones could be obtained. I was about to return when I noticed a farmer loading a cart with straw. He kept building it up until it reached a considerable height, and then tied it down with ropes. This, I thought, would form a platform high enough for my purpose, and on my offering to pay him for his trouble, he managed to get the cart into a suitable situation. The horse was taken out, and a plank and the lid of my box, laid on the straw, formed a firm floor for the legs of the tripod. From this perch I got two good views, and I have since used the same device successfully to raise me above a hedge or some other obstacle.

This view completed the round I had marked out on leaving home, and as it was getting towards evening, I went down to Greenhead Station, and arrived in time to catch the train back to Hexham.

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STUDIES AND PICTURES

A passage occurs in a letter by Mr. Carey Lea to a contemporary, on "Photography and Art," which so admirably illustrates a thought which has often occurred to me in visiting photographic exhibitions, that I will, with your permission, transcribe it, and add one or two remarks on a subject upon which it has an intimate bearing. I should premise that it appears that certain of the correspondents of the journal in which Mr. Lea's letter appears have been girding at him for some remarks he had made on photography and art, or photographers and artists, and misrepresentating what he said, which renders it necessary for him to repeat his words. He says, "What I did say was, that now, an artist must be one in the highest sense of the word—a creative artist—or else be crushed by the camera. And this I reaffirm—not scornfully, but with the sincerest sympathy for those unfortunate men with half talents—enough to give them the earnest wish to excel, and yet without the power. I know the class thoroughly well, as who does not who has spent much time in the galleries of Europe, and has looked from the originals to the wretched copies making beneath them, and which the makers call 'only studies' to excuse, perhaps even to themselves, the unfathomable gulf which lies between the original and the reproduction?"

It is in reference to the phrase "only studies" I wish to make some observations, which may, I think, be worth the consideration of young photographers. Mr. Lea conceives that the painter student excuses to himself his own imperfections by styling his work "a study." Nevertheless he has some excuse for the term. Such work is, in some sense at least, study. The student may be—indeed, if he have anything in him, he *must* be—becoming familiar with the style of the master he copies, and learning how he produces certain effects. But what can be said of the young photographer who fritters away his time in producing "photographic studies"? What end do they serve, or who is profited by them? I have seen the operation frequently. The novice has picked up at random a few of the adjuncts of the theatrical property-room or of the painter's studio, consisting of a nondescript piece of drapery with braiding, embroidery, or fringe on it; a head-dress of some kind; a piece of old armour; some stuffed birds; a vase or two; a few plaster casts, and a bronze statuette. These represent various periods and styles of art, classic and Gothic, ancient and modern. A sitter is victimized for a day's "study," and the said accessories are piled together on and about the model in defiance of all law of period or style, without any definite idea or intention. A photograph is produced, and if the accidental conglomeration suggest any idea, a title is given, and some lines are hunted out of a dictionary of quotations, of which the picture is supposed to be an embodiment. If the figure be that of a youthful female, and the drapery have any oriental suggestion about it, the picture will probably be named "Jephthah's Daughter," with a quotation from "Percy's Reliques" added:—

> "Have you not heard these many years ago
> Jeptha was judge of Israel?
> He had one only daughter and no mo,
> The which he loved passing well."

If, however, as is most frequently the case, the picture, when produced, suggest no idea at all, it is then dubbed "a study," with many more of the same kind, in which the changes are rung on the oddly assorted lot of accessories of which the student is the happy possessor.

Perhaps it is only fair, in passing, to admit that the photographer is not without some warrant amongst the adherents of some of the older arts for this practice. I have known paintings produced without much more intention, and titles found for them when completed, much in the fashion already alluded to. One, amongst many stories familiarly current in the profession, tells how a certain picture, originally intended as "Joshua calling upon the Israelites to shout," was changed into the "Preaching of Peter the Hermit." It is enough here, however, to observe that a precedent may palliate, but cannot justify, a bad practice.

My aim here is to ask the ardent youthful photographer, whose yearnings after art have been fired by declamations on art-photography, but who unfortunately has not, as Mr. Werge recently well remarked, received as much guidance or instruction as he has received scolding from those who have assumed the position of his art-teachers, if he have ever asked himself seriously what he meant by these studies? Some months ago it was remarked by the Editor of this Journal, that "studies were only aids to something else." But to what else are the photographic studies aids? I can understand photographic studies being produced to aid a painter—studies of a hand, foot, or eye—studies of the tension of muscles, or of fore-shortening; but nine times out of ten these will not be of any use except when produced under the instruction of the painter, and designed for some especial end, in view of which they are to serve as memoranda, to save the necessity of repeatedly placing the model in the same position. And then they will only serve as memoranda, for the conscientious painter will not entirely dispense with painting from nature, even with these photographs by his side. But what are these figures in fancy costumes studies of? Does the photographer fancy a painter will use these as studies, and find a purpose in the work which was unknown to the workman? They are not studies by which the photographer progresses to something higher. The painter's studies, when he roughly sketches an idea as a suggestion in aid of a complete work, or when he carefully works out some portion in the study before he trusts himself to place it in its position in the great work, is really a means to an end. He is mastering something as he studies, and the studies produced have a meaning. But what meaning could be educed from one or a dozen of these photographic studies? They are like the sybilline leaves, disturbed by a gust of wind after they were laid at the mouth of the cave; and nothing can give them a meaning, or extract from them a purpose.

But may not, or rather *must* not, a photographer study? Must he not study effects of light and shade, arrangement of drapery, posing of the figure, etc., etc.? Undoubtedly yes; he must study if he would excel. Effects of lighting?—yes; but this will be as well done on a plaster figure as on a model dressed for a masquerade. Arrrangement of drapery and posing of the figure?—yes; and these may be best done with the aid of the model. But let the time proposed for study be devoted to study, and do not present the chance results of study as pictures, either with or without unmeaning names appended.

But there are other modes in which the photographer must study if he intend to excel in art. He must study good pictures, and he will acquire more of the spirit of art in endeavouring to produce a good copy of one good picture than in obtaining a dozen of the so-called studies to which I have referred. But there is still another form of study to which I wish to direct the attention of the young art-photographer: he must acquire and cultivate in some degree the use of the pencil. I do not mean that he must needs become a painter, but he must acquire sufficient facility in drawing to be able, when he conceives a picture, to place a sketch of it, however slight, on paper, so as to have his arrangement of lines and distribution of chiaroscura before him; or if he see an effect of light and shade, or of grouping, which he may wish to reproduce with the camera, that he may, by means of his pencil, preserve a memorandum of these effects. These I should regard as the real studies of the photographer, which would probably do good service in his future pictures.

And these would aid in securing a characteristic which, whilst it has been pre-eminently wanting in photopraphic pictures, it is, in my estimation, pre-eminently necessary to secure. I mean *intention*. It is of primary importance to the culture of the artist that he should work with an intention; that he should know what he means by his picture, instead of blindly groping after some kind of effect of which he is uncertain. If the good went no further, it is due to the artist, as a means of culture and a source of self-respect, that this definite purpose should be present; but its presence is not less valuable in the picture. The manifest presence of intention at once gives vitality to a picture; there is something which appeals to the intellect of the looker-on. It is not merely a piece of delicate manipulation or wondrously managed light and shade; it is not merely a striking expression, which may mean rage or may mean despair, the beholder is uncertain which. However simple the subject, if it have a distinct meaning, and that meaning is in the minor objects led up to, as well as in the principal features of this picture definitely expressed, it at once acquires a human interest which the highest phase of technical excellence alone would fail to excite.

I should be sorry to be tedious, and I know the risk of becoming so, in the persistent reiteration of an idea one is anxious to enforce. I will simply add, therefore, the advice to "the young art-photographer," to endeavour to produce complete pictures and avoid "studies." However small or simple the picture, let it be a whole and not a fragment, and let it have a meaning which can be explained, even should it fail to explain itself. It was doubtless funny of Punch's peep-show man, when asked which was Daniel and which the lion, to reply, "Vichever you likes, my little dear; you pays your money and takes your choice!" but if photography ever vindicates its art-capabilities and its art-position, it must be done by the aid of earnest men who know their own meaning, and strive earnestly to make their pictures convey that meaning to others. Those "unfortunate men with half talents" to whom Mr. Carey Lea refers, who try everything and succeed in nothing, and who are generally chiefly distinguished by vague yearnings and ecstatic declamation on art questions, have failed chiefly, depend upon it, because they never had a definite purpose, and even with their half-talent steadily stuck to that purpose. When the Spartan's sword was too short, he was told to add a step to it. Half a talent steadily directed with unwavering purpose rapidly grows into a whole talent. I conclude, then, by repeating,—Have a purpose in your pictures as well as in your life. RESPICE FINEM.

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THE NEW ORGANICO-IRON DEVELOPER.

BY WILLIAM THOMPSON.

[The following is an extract from a letter to the editor of the *Philadelphia Photographer* from an Army Surgeon.]

SHORTLY after the appearance of Mr. Lea's description of his developer in the June number of *The Photographer*, four efforts were made to prepare it in accordance with his formula, the simplicity of which seemed to afford no ground for error, in the last of which the Pulvis Ferri of the Pharmacopœia, which is pure iron in a state of minute division, was used to insure the saturation of the sulphuric acid.

In each instance the result was the same; no image could be made to appear, and the plate remained as clean as though the lens had not been uncovered, until at length the free nitrate of silver was decomposed into a black precipitate. It was evident that the gelatine had been so changed by the sulphuric acid as to restrain entirely a solution which must contain about 100 grains of sulphate of iron to the ounce.

When exposed to heat with dilute sulphuric acid, gelatine undergoes a change somewhat similar to that by which starch is converted into glucose, and is transformed in part into glycocine or gelatine sugar, a crystallizable substance, which will be found described in the standard books on chemistry. I proposed to induce this change, and to use the product with a solution of iron of a known strength. One ounce of gelatine was boiled in a mixture of three ounces of water and one fluid drachm of sulphuric acid, and when a portion of the mixture corresponding in strength to Mr. Lea's solution was neutralized with ammonia, and used with a solution of iron of 30 grains to the ounce, no sign of an image could be produced. After great dilution of the gelatine, the iron solution remaining of the same strength, the high lights alone were developed, and negatives equal in hardness to the worst under-exposed and over-intensified tannin plates were obtained.

A further dilution of the gelatine, even to a fabulous extent, afforded the restraining effect desired, and gave negatives transparent in the deep shadows, delicate in detail, and dense enough to print without any further intensification. The energy of the altered gelatine is shown by the fact that by Mr. Lea's formula, 15 ounces of developer are made from one ounce of gelatine, by avoiding carefully the application of heat, whilst by the modification herein described, the same quantity of gelatine, after having been exposed to a high temperature, will replace as a restraining agent the acetic acid in 64 gallons of the ordinary solution of iron. However problematical this statement appears, I would remark that anyone who employs the "rule of thumb" with this substance will meet with disappointment, since the altered gelatine cannot be used with benefit in quantities much greater than those which I have been at some pains to discover thus empirically. The formula can, of course, be varied by every practical man to suit his own convenience by adhering to the same proportions:—

℞. Gelatine	1 ounce
Water	3 ounces
Sulphuric acid	1 fl. dr.

Add the gelatine to the water and acid mixed in a glass or porcelain vessel, place it in a sand or water bath, and boil for thirty minutes, or until the solution does not gelatinize on cooling, After it has becone cold, add water sufficient to make it measure 4 ounces.

This may be designated solution No. 1; it is acid, since the sulphuric acid has not been decomposed, and will probably keep indefinitely.

Since acetic acid will not be required, I have endeavoured to provide a substitute for this old favourite in the solution No. 2, which is made by adding one fluid drachm of solution No. 1 to one pint of water. To prevent decomposition, add to it two drops of creasote dissolved in one drachm of alcohol. This pint, which is proposed as a substitute for acetic acid, and one or two ounces of which will be enough for one pint of solution of iron, contains a little less than two drops of free sulphuric acid, which can be conviently neutralised by adding to it a small portion of prepared or scraped chalk; but since the pint of developer will contain but one-eighth to one-fourth of a drop of acid, I see no great necesssity for the use of the chalk.

To make the developer, I prefer a saturated solution of sulphate of iron, each drachm of which contains about 25 grains of the salt.

℞. Saturated sol. of sulph. iron ...	2 ounces
Solution of gelatine No. 2 ...	2 „
Alcohol	½ ounce
Rain-water	12 ounces.

Each ounce of the above contains 25 grains of iron and 1 drachm of the solution of gelatine. It can easily be distilled one-half for out-door work. Most of the negatives were developed with this formula.

The collodion used contained 5 grains of cotton in 1 ounce of equal parts of alcohol and ether, and was bromo-iodized with magnesium; with an acetic acid developer it was found impossible to produce negatives with sufficient vigour and contrast to print well without re-development, which, with its loss of valuable time and its numerous failures, rendered out-door work more vexatious than pleasurable, but upon substituting the solution of gelatine, clean, vigorous, soft negatives, full of detail, and yet intense enough to print, could be obtained by the first application of the developer.

A series of experiments have been made with a binocular camera, upon glasses cut with a diamond, and broken apart after exposure to test the gelatine with acetic acid with a solution of iron of the same strength. In every instance, and under the same circumstances of exposure, the gelatine produced the more intense image with the same amount, if not more detail.

The main object has been to obtain a developer which, with good collodion, bath, and proper exposure, would yield a good printing negative on the first development; and it appears to me, with a limited experience, that the result has been attained. None of the negatives have been re-developed. When more density is required, a solution of silver, or a few drops of the bath, can be added to the developer, and poured upon the plate before fixing or exposure to light. Its superiority to acetic acid for rapidity of work is shown by the fact that I have taken twelve negatives in a short afternoon, all dense enough to give good prints on the first development, when, with acetic acid and consequent re-development, I should have been satisfied with one-third of that number. It seems to possess the advantages described by Mr. Lea, since it flows over the plate with some degree of viscidity, mixes fully with the solution of silver before the image begins to appear, is hence less likely to cause stains than acetic acid, is equally as sensitive, gives, I think, more detail with the same exposure, and so holds in check the deposit of the silver that the image gains its proper density slowly, and finally, it seems impossible to produce any fog.

That the active agent is glycocine is rendered probable by the microscopic examination of solution No. 1, in which numerous beautiful needle-shaped crystals can be seen, and by the addition to it of an equal volume of strong alcohol, in which glycocine is insoluble, and which causes a white precipitate composed entirely of these crystals. The minute quantity required to restrain the iron is the most remarkable feature, since a pint of the developer cannot contain more than from one to two grains. But for an unavoidable interruption of my experiments, I should have endeavoured to isolate the glycocine, and ascertain whether to it alone is to be ascribed the advantages of the ferro-gelatine developers.

Be the theory what it may, all photographers will be placed under obligations to Mr. Lea for his introduction of this novel but valuable element into the mysteries of the dark-room.

THE COLLO-DEVELOPER.

BY M. CAREY LEA.[*]

So much has been already written and published on the subject of the new mode of development, that anything further might seem almost superfluous, were it not that no one who has written on this method, so far as I am aware, has pointed out the exact differences which exist between it and the old process, except, indeed, to say that a picture may be obtained of sufficient strength without the use of a pyrogallic redevelopment, and that fogginess may be avoided even in a case of protracted development. I propose here, therefore, in a few words, to describe what I think the characteristic differences between the usual method and the new.

Let us select for comparison any ordinary iron developer. That which I have used for this purpose has contained 20 grains of sulphate of iron to the ounce, and acetic acid in the proportion of 4 ounces to 40 of water. But this is not at all important. I have largely varied the proportions, and still the characteristic differences are perfectly observable.

As a mode of comparison, I prefer simply to watch the action of the developer in a capsule containing some bath solution, because in this way I can make the comparison under circumstances absolutely identical, which cannot be equally well accomplished in developing plates, although this latter method must, of course, be used to confirm the results; but in order to obtain clear views, it is essential that exactly the same proportion of bath solution should be present in all the solutions. My method is to drop three drops of bath solution into each capsule, and then to throw in as much developer as fills a little vessel of about a drachm in capacity.

Two such capsules are easily managed side by side, or even three, and the comparative action of the different developers can be watched with the most satisfactory exactness.

If we now suppose the ordinary iron developer to be tried in this way, we shall observe the following appearances. The invisible stains on the bottom of the capsule will rapidly show themselves, but not very strongly, and of a pale greyish colour. Presently the liquid becomes turbid and dirty. Then it clears itself by depositing a whitish-grey powder, and all action ceases. During this time, however, the stains have not increased materially in strength; in fact, after the first half minute, they rather diminish in strength, as if the finely divided silver was dissolving again to a slight extent in the acetic acid; and this forcibly recalls the observation occasionally made, that after the application of the iron developer, when the image ceases to gain in strength, and still more if it appear to lose in strength, the developer must be quickly washed off.

With the collo-developer, the action is strikingly different. The invisible stains on the porcelain do not come out quite so suddenly, but they go on regularly increasing in strength, and having, from the first, a blackness of colour that contrasts strongly with the whitish-grey shade of the common development. Now this action goes steadily on, and does not stop like that of the common developer, but continues until innumerable marks are everywhere brought out in great black masses. It seems no unreasonable deduction to believe that the statements of those who with me affirm that more detail is got by this developer than by any other, are justified by these appearances.

If, at the end of some time, we compare the two capsules, when all the energy of both developers may be considered as spent, we shall find that in mass and density, the deposit in the collo-developer is, by very much greater than that produced by the common developer, out of all comparison with it.

The contrast, then, may be stated as follows:—The common developer acts energetically for a few seconds, and then stops its action; if continued on the plate, either may thin the image, or fog it, or possibly both. Moreover, the greyish-white colour of the deposit offers so little resistance to actinic rays, that we are very often forced to fill up more of it by a pyrogallic redevelopment, which at the same time darkens the colour.

But with the new developer we get a regular and continued action, which we may make steady and moderate by adhering to the proportions which I have given, or may increase in rapidity by adding protosulphate of iron, as some have preferred to do. The deposit is, from the first, a black and not a grey one. It loses this colour to a considerable extent as the negative dries, but recovers it in the varnishing.

Before concluding, I may remark that Mr. T. P. Shepherd writes to me that he has never had any difficulty in preparing my developer, having from the first used wire for the purpose of saturating the acid. I think the suggestion an excellent one. When tacks or filings are used, they rest at the bottom of the vessel, and the liquid around them becomes soon to some extent saturated, and ceases to act. Stirring remedies this, but constant agitation would be necessary to prevent it completely. Bunches of bent wire extend all through a liquid, and tend to produce a slow, regular, and steady solution, which is exactly what is wanted,

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[*] *Philadelphia Photographer.*

Mr. Shepherd found ten days necessary to get his developer into condition.

I have never experienced the tumultuous and violent effervescence that some have described, and can readily believe it to be very detrimental to the quality of the developer where it occurs.

The advantage in the respects above mentioned is, as I believe, not merely an apparent, but a real one. Many photographers speak as if they were under the impression that an iron solution was capable of throwing down the whole of the silver contained in a silver solution, and as this error seems to be wide-spread, it may be worth while to quote what Leopold Gmelin says on the subject, in his Handbook of Chemistry :—

"From an aqueous solution of nitrate or sulphate of silver oxide, green vitriol throws down a greyish-white pulverulent precipitate of metallic silver which redissolves on boiling. The precipitation is incomplete; a silver solution mixed with green vitriol, and separated from the precipitated silver, still yields a precipitate of chloride of silver with common salt, and likewise a precipitate of metallic silver on further addition of green vitriol."

The larger amount precipitated by the collo-developer thus finds its legitimate source. It is, then, a mistake to conclude that when the common developer ceases to act, it is because its silver is exhausted. Moreover, what Gmelin says refers to neutral solutions; when the action of the iron is restrained by acetic acid, as in the common developer, it is still more incomplete, and I believe that in some cases but a comparatively small portion of the silver is made available for building up the negative.

Thus an iron developer still rich in silver has to be rejected because it has lost its energy, and must be replaced by a pyrogallic one, involving a waste of time, trouble, and valuable material, which every photographer will readily appreciate.

Another material difference lies in the fineness of the deposit. The common iron developer throws down a coarse-grained, crystalline deposit, which is necessarily less capable of expressing minute gradations than a finer one. The deposit from the collo-developer is much finer.

The comparison, then, may be stated as follows:—The common developer acts energetically for a few seconds, and then stops its action almost as suddenly as it began, whilst the collo-developer throws down a regular and increasing precipitate so long as the silver last; and when this is exhausted, the action may be restored by simply adding more silver solution to the same developer.

The deposit is also much finer in its grain, and its colour causes it to better resist the passage of the actinic rays.

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Correspondence.

SOME MORE ERRORS IN PICTORIAL BACKGROUNDS.

Sir,—As a subscriber to your Journal, I read with pleasure Mr. Werge's paper on "Errors in Pictorial Backgrounds," and, from the able manner in which the subject was discussed, I have no doubt that it will prove of infinite service to many; but there are other very glaring errors in backgrounds, both landscapes and interiors, which tend to destroy the photograph as a picture, and one of the most serious of them is a want of due attention to the harmonious arrangement of light and shade. If you think the following hints are likely to be of use to any of your readers, I shall feel gratified by their insertion.

In the first place, what is the proper use of a background to a portrait but to give relief and individuality to the figure? And as we have only a flat surface on which we can suggest the rotundity and solidity of nature, we must resort to artifice in the management of the background to enable us to approach as near as we can to that end.

Now, the photographer has but one colour by means of which to produce his picture, the same as the engraver who has the printer's ink only wherewith to form his; therefore the same rules in the management of light and shade apply equally to both of them in the practice of their respective arts, and it is only by a proper study of the gradations of the lights and shadows that a pleasing and effective portrait can be produced, and I can refer to no finer examples than the beautiful engravings after pictures by such men as Reynolds, Gainsborough, Lawrence, and Grant, Buckner, and others of the present day.

In a picture there should be one general principle of light and shade throughout; if a portrait, the figure should be the point of the picture, and everything else should be secondary and for the purpose of illuminating and giving importance to it. The high lights should be brighter, the shadows deeper, the outline more continuous and defined than anything in the background, and there should be a careful gradation of light and shadow from the figure and principal accessories to the extreme distance in the landscape. By keeping the principal mass of light on the head, the eye of the spectator becomes fixed there, and never wanders away from it; you wonder why it is so brilliant; and the powerfully effective portraits of Sir John Watson Gordan testify to the truth of this system. I have seen portraits with so many bright lights spread all over the picture that the head of the unfortunate sitter was the last thing to be observed; a fluted column on one hand, a large vase on the other, an elaborate series of balusters behind, and an ornamental garden with terraces, fountains, flower-pots, and sky, spoke of the industry and imagination of the painter. We are all quite familiar with such things, and I am told the public like them—that they like as much detail and quantity as can be squeezed into a picture; but I think it is the duty of photographers to learn for themselves, and to teach the public better. You cannot have a *pretty* landscape background when you wish to give dignity and importance to the figure; it must be painted with feeling, with breadth, and should be suggestive without detail; if otherwise, there is no concentration or repose, and the whole effect is scattered and unmeaning.

Of course all these matters must be modified by the judgment of the photographer in composing his picture according to the exigencies of the case and the costume of his sitter; but I am afraid it will be difficult to attain perfection in pictorial backgrounds until photographers become artists in reality by painting their own, or by painters of backgrounds becoming photographers themselves.

Engraver.

THE ORGANIC DEVELOPER, &c.

Sir,—If you will allow me I should like to say a word in echo of Mr. Wenderoth's article in your last. Having tried carefully and comparatively nearly all the different formulas published, I am a thorough unbeliever in gelatine developing. I cannot doubt, from the mass of testimony, that it suits some gentlemen, but I should be glad to know what constitutes the difference between their conditions of working and my own. With a neutral bath made of triple-crystallised silver and pure distilled water, I get density enough; and too much, if not careful, by using Herr Wothley's form of developer. This is about 16 grains of iron and 6 minims acid to the ounce; negatives clean and brilliant; often no need to intensify even at this time of year. With the gelatine I have invariably got a loose, coarse, black deposit, the negatives having an under-exposed, hard look. With me double the exposure and time of development would be needed, and then softness and delicacy would be gone. In the studio I have found all my efforts needed to prevent density rather than encourage it. For out-door photography the gelatine is equally unmanageable in my hands. For a day out I tried Mr. Hughes's forms, and could not get a decent sky.

I, for one, should be glad to see the space occupied by new developers, &c., in your valuable Journal, devoted to articles tending to elevate the artistic taste of the photographic brotherhood.

I have noticed lately that it has been the fashion to decry ebonite ware for photographic purposes. In justice to its introducers I might say, whilst writing, that I have had a 12 by 10 ebonite bath in constant use a year-and-a-half, and it has not injured the solution yet.—Yours truly,

B. Wyles.

FORMIC ACID IN THE NEW DEVELOPER.

Sir,—As I see that you mention, in "Answers to Correspondents," an old formula of mine, for the addition of formic acid to the iron developer, may I ask for space to mention that I find it of the greatest value in the new gelatine developer, in the proportion of from six to fifteen minims to the ounce?

Its tendency to increase detail in the deepest shadows is most valuable, and it also tends to prevent excessive density in the lights.

In my own experience I find the gelatine developer excellent for obtaining softness and density together; in the specimens I enclose, you will note how well the white dress and the face harmonize. I think many experimenters with this developer fall into error at the beginning.

A very small quantity of the sulpho-gelatine is required to give density to a well-lighted picture, and is in many cases insufficient to prevent a slight fogginess. It is now, I think, that the error creeps in—viz., the operator adds a few drops more of the sulpho-gelatine, which tends to give too hard a picture. He should add a few drops of acetic acid, to the same proportion of iron and sulpho-gelatine, and he would then, I think, be satisfied with its working. I find the use of a highly bromized collodion, such as I have always advocated, desirable for use with this developer.

I have used it with great advantage for dully-lighted landscapes, and in cases where the plate has been kept from half to three-quarters of an hour out of the bath.

Occasionally, it is wise to develop with iron and acetic acid, and to intensify with sulpho-gelatine and iron, adding a few drops of solution of nitrate of silver.

I find Mr. Carey Lea's original formula give excellent results, but for simplicity of preparation, and as nearly as possible equal excellence of results, the formula given by Mr. Cooper is all that can be desired.—I am, sir, yours faithfully, Stuart Wortley, Lieut.-Col.

Belvoir Castle, Grantham, January 26th, 1866.

[The examples enclosed by Col. Stuart Wortley are some of the most charming pictures we have seen produced by photography. Charmingly round, delicate, and forcible, they are also admirable examples of artistic arrangment and lighting.—Ed.]

A PLEA FOR THE NEW DEVELOPER.

Sir,—May I be allowed to suggest, with regard to comparative trials made with the various iron developers, that, in order to obtain results from which a fair judgment can be made, each solution should be used in its best working condition.

I think that Dr. Vogel has, in using my developer added too much acetic acid. It will be seen that he uses three parts of acetic to three of iron, as well as some glycocine solution (of the quantity of which we are not informed); but from the same paper we gather that the three parts of iron and the three parts of acetic formed by themselves a developer well suited to the delineation of the subject on hand. Now it is evident that if, under these circumstances, more restraining agency is added, the result will be unsatisfactory—as, indeed, it was with the experiments of Dr. Vogel.

If, to the solution as given by Dr. Vogel, a few drops of formic acid had been added, no doubt the test-object selected would have been properly rendered.

The object of the organic iron developer was to obtain rather more intensity in the first development than usual, and the white bust with black drapery would form a subject for the successful rendering of which less intensity would be required in the first instance, and, therefore, one for which the new developer would not be required.

Without wishing in the least to derogate from the ability of Dr. Vogel to form a correct judgment as to the new developer, I have the honour to remain, sir, your old servant, Nelson K. Cherrill.

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Photographic Notes and Queries.

Gelatine in the Printing Bath.

Sir,—The amount of prominence given in your pages on several occasions, during the last year, to the subject of gelatine in the printing bath, and the distinct announcements made that the discovery was due to Mr. J. E. Palmer, of Stonehouse, led me, as I presume it did most of your readers, to believe that an addition of gelatine to nitrate of silver was a novelty. I was surprised a short time ago, therefore, to see an intimation in one of the journals that there was nothing new in the matter, but that the idea might be found in all the text-books. In a recent letter by Mr. Carey Lea, in one of your contemporaries, he states that "formulæ for nitrate baths with gelatine will be found in most of our text-books. Two are given in Professor Towler's very useful hand-book, at page 182. These are intended for nitrate baths. Mr. Palmer has lately introduced the same method into ammonio-nitrate printing, though with a different manipulation." Will you kindly state in which of the text-books this information is to be found besides that referred to, and also state if Professor Towler's hand-book was published before Mr. Palmer's method, and if it can be had in this country?—Yours, &c., Querist.

[So far as we know, the introduction of gelatine into the silver bath is due to Mr. Palmer, and we do not know of any text-book in which the matter is referred to. Mr. Lea is generally such a trustworthy authority that we think there must be some misunderstanding somewhere. He probably refers to the use of gelatine in printing, not in the printing bath. On page 182 of Professor Towler's "Silver Sunbeam," which is, we presume, the hand-book referred to, there are no formulæ; but on page 192 of the same book there are two formulæ in which gelatine is employed, but it is in conjunction with the chloride used in preparing the paper before floating it on the nitrate bath. The use of gelatine in the preparation of plain paper has been common for many years. Professor Towler's "Silver Sunbeam" is published in London by Trübner Paternoster Row.—Ed.]

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Talk in the Studio.

The Alleged Early Photographs.—The *Times*, reviewing Mr. Smiles' Lives of Boulton and Watt, remarks on the subject: "It has been suggested that the question of photography was a matter of discussion at the monthly meetings of the Society, and the discovery of a photograph in Mr. Boulton's library at Soho, which it was asserted had not been opened for about fifty years, gave rise to the rumour that some of its members had actually practised the art at that early date. The plate is still in the possession of Mr. Petitt Smith, of the Patent Office Museum, but there seems to be little doubt it is of modern production. The "Lunatics," as they were called, did not hide their lights under a bushel, as we well know from the dispute among its members as to the question of the discoverer of the composition of water, and not one word with reference to the art is to be found in any of their familiar letters to each other."

Cambridge House.—We are informed that shortly after Lord Palmerston's decease, a well known firm, just adding photography to their other occupations, made an offer to the executors of the noble Premier of £2,500 per annum for Cambridge House on lease, their intention being to convert it into a photographic studio. The offer was, however, refused; and we understand that the firm in question is now in search of equally extensive and costly premises, having already engaged the services of one of our best known photographers to conduct this branch of their business.

PHOTOLITHOGRAPHY.—The city article of a morning paper is scarcely the place to look for photographic intelligence, but here is a cutting from the half-yearly report of Day and Son (Limited), the well-known lithographic and publishing firm, which has appeared in the *Standard* monetary column. It is surprising that photolithography has not been taken up to a much greater extent than it hitherto appears to have been in London:—"The directors believe that the business as at present developed is but the nucleus of what may be done, and with this object in view considerable alterations have been made to the premises in Gate Street, and large additional and adjoining buildings purchased. Greater facilities will thus be afforded to the publishing department; photography, as applied to photolithography, will be carried on at the top of the new premises, and law writing, law stationery, and printing at once commenced upon. In addition to this, the company has just commenced business as artistic and portrait photographers at 43, Piccadilly, under the able management of Mr. Vernon Heath."

THE INTERNATIONAL EXHIBITION IN PORTUGAL.—We are glad to record, that at the International Exhibition in Portugal, just closed, Mr. Netterville Briggs, of Leamington, successor to the portrait business of Mr. H. P. Robinson, has received a first-class silver medal for his portraits, being the only medal awarded in that department to an Englishman. This affords the best assurance that the *prestige* of the business which attained such reputation and success in the hands of Mr. Robinson is worthily maintained by Mr. Briggs.

THE NEW DEVELOPER.—Mr. G. H. Martyn, of Plymouth, sends us some charming cards as illustrative of the action of the new developer, the solution he employs being a mixture of the ordinary protosulphate developer with a little of a preparation analagous to that proposed by Mr. Carey Lea. It consists of common glue 1 ounce, sulphuric acid 1 ounce, water to make up to 5 ounces; in this solution iron wire is placed and left for 4 or 5 days, so as to saturate it. Then 5 ounces of water are added, and acetate of lead to neutralize any free sulphuric acid. One drachm of this, after filtration, is added to an ounce of a 30-grain solution of protosulphate of iron. The pictures are admirable, round, delicate, vigourous, and of excellent texture.

To Correspondents.

⁂ MR. WOODBURY'S PHOTO-RELIEF PROCESS.—The distribution of our Presentation Print has occasioned a deluge of letters to be forwarded to Mr. Woodbury, which he finds it impossible to answer personally at present. He requests us to intimate to those making enquiry as to licences that as soon as the arrangements are definitely fixed, details will be announced in our advertising columns.

R. W.—The amount of side light in your room is far too little. It must extend on the east side, if not on both sides, at least as far along as the top light; it would be better if extended even a little further. We should have preferred the side light carried at least twelve inches nearer to the ground. Your print is meally, apparently from the use of a toning bath too freshly made.

B. W.—The cards are, on the whole, good. The lighting is good, but, so far as we can see, would be improved by a trifle less top light. The printing and toning are good; we like the warm tone. The chief fault is in the disposal of the hands in each figure, which is, in some cases, a little awkward. The lens, so far as we can judge from the subjects, which are not very trying, is pretty good.

W. S. D.—Thanks for the remarks, with which we most cordially agree. Many thanks, also, for the exquisite proof received; it is one of the most choice impressions we have ever seen of any engraving. The engraving is exceedingly excellent and effective, and we admire it very much. The examination of a fine and early impression of a good engraving tends very much to produce disgust with pictures on albumenized paper. Shall we ever secure anything in photography like the rich texture and surface of a good engraving? The cards enclosed well illustrate your arguments. We like the composition of the lady's portrait best.

M. N.—M. Poitevin has not published in detail the method whereby he prepares his violet sub-chloride of silver. He simply states that it is obtained by the action of light and a reducing agent on white chloride of silver.

BANDON.—In order to remove the albumen film, containing the image, from paper, it is necessary to use a paper prepared expressly for the purpose. You can obtain it of Mr. Trübner, of St. Dunstan's Hill. 2. The question whether coloured crayons would be affected by contact with the silver solution, &c., will entirely depend upon the nature of the pigments used in the manufacture of the crayons.

W. D. Thanks. We will observe the suggestion.

X. Y.—The proportion of red oxide of lead should be 6 parts to 2 parts of sand and I part of borax.

PALETTE.—It is important that the preparation of sensitive paper, toning, fixing, &c., should be conducted in a dull light; but it is by no means important that the room should be as dark as that in which collodion plates are prepared. In point of fact, the importance of a very dark room decreases as the materials are less sensitive to light. A sensitive collodion plate would be ruined by a single glance at white light, whereas a sheet of sensitized albumenized paper would not be perceptibly affected by it. 2. Glass pictures will not be injured by water kept in a vessel painted with white lead. 3. Probably that you mention is as good as any. 4. In speaking of a 30-grain solution or a 40-grain solution, and so on, the term always means that 30 or 40 grains, as the case may be, are added to the ounce of water. 5. The full-length figure is very good indeed, and the lighting is very pleasing. The other is not bad, but the light comes too directly in front of the face to be quite satisfactory. A profile is generally most effective if the light be slightly behind.

H. S. W.—In asking our advice as to the kind of apparatus to get, you leave us uncertain of the purpose for which it is required. Do you want to take portraits only, or portraits and views? Do you wish to take card pictures, or larger sizes? Send us details, and a stamped and addressed envelope, and we will endeavour to help you.

AN ARTIST.—For life-size portraits, finished in monochrome, crayons are, we think, more effective than water colours. The only mode in which you will be likely to ascertain the photographers requiring such work will be by either calling upon many, or by advertising in our columns.

PIP.—There is some defect in the collodion when the film of collodio-chloride of silver splits off. Either it is made of pyroxyline giving a film too horny and contractile, or it has become decomposed by long keeping in contact with free nitrate of silver. If varnish be used, it is better to apply it after printing and before toning, &c. If any application be made to the edges of the plate before coating, we employ dilute albumen. After the film is set, we generally dry it completely before the fire, and print as soon as it is cold. With some samples of glass we have found the image on the glass after the film has been removed, in which case it is very difficult, if not impossible, to get the glass perfectly clean again. Your experience agrees with our own as to the excellence of the saccharated iron developer.

X. Y. Z.—It is probable that an increased amount of side light on the north side, notwithstanding the obstruction from the wall, will be more valuable to you than any light you at present receive from the roof on the south side, and therefore the change will be desirable. A good plan to ascertain the amount of light you will obtain from any direction is to place yourself in the position of the sitter, and look in the direction from which the intended light is to be derived. The proportion of sky you can see from such a position indicates the amount of light falling in that direction on the model. 2. The chief use of swing-back cameras is to keep the sensitive plate parallel with the object to be taken, in cases where the camera requires tilting. For instance, in taking a building in a circumscribed space, it is necessary to tilt the camera in order to make it include the top of the building. When the camera is thus tilted, however, the upright lines appear to converge or lean inwards, unless a swing-back be used to keep the plate parallel with the building. A rising-front is used for a different purpose, its chief use being to regulate the position of the picture on the plate, making it include more or less of foreground or sky as may be required.

PHOTO.—If there be an ample side light of plain glass, the top may frequently, with advantage, be glazed with corrugated glass, especially where there is much vertical light constantly. 2. We do not see any important advantage to be gained by sloping the side light. 3. We do not know sufficient of the instrument to offer an opinion. No. Harrison is considered the first American lens maker. 5. Certainly not in advance of this country

G. LEWIS.—Samples of tannin vary considerably in solubility. So far as we know, Mr. Hughes does not employ any alcohol in the solution. We prefer the addition of honey, and have not found any disadvantage arise from its use. The print enclosed is very good.

A HOXTON SUBSCRIBER.—Try with the same materials cold, and let us know the result.

C. M. MULLER.—Phosphorus burnt in a jar of oxygen emits a most intensely brilliant light.

THE ADVANCE OF WAGES AMONGST CAMERA MAKERS.—We have received another letter from Mr. Worth, who is anxious that it should be distinctly understood that the camera makers do not receive higher wages than cabinet makers generally. Mr. Worth states the case of the men with so much modesty and intelligence, that we have pleasure in giving publicity to his statement of the fact.

Several Correspondents in our next.

Photographs Registered during the past Week.

MESSRS. HUTCHISON AND KEEGAN, Dublin,
Photograph of the Davenport Brothers

MR. S. HOGGARD, Middlesboro',
Portrait of G. Marwood, Esq.

MR. S. WOOD, Torquay,
Photograph of Ships wrecked at Brixham, Devon.

MESSRS. W. AND E. DOWNEY, Newcastle,
Portrait of Rev. Canon Clayton.

MR. F. SNAEV, Bristol,
Two Portraits of Major Tireman.
One Portrait of Rev. James Stratford.

MR. F. DOWNER, Watford,
Two Photographs of Caractacus, Winner of the Derby, 1862.

THE PHOTOGRAPHIC NEWS.

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ON THE STUDY OF ART BY PHOTOGRAPHERS.

"The attainment of a perfect knowledge of Forms, as exemplified in the highest perception of the minute delicacies of Beauty and Character, requires a study that will end only with the life of the artist. And though much may be done to direct and facilitate the study up to a certain point, all beyond that must be learned; and *perhaps* may require the peculiar property of mind which is called genius, to attain."—Howard.

"It has been the fate of arts to be enveloped in mysterious and incomprehensible language, as if it was thought necessary that even the terms should correspond to the idea entertained of the instability and uncertainty of the rules which they expressed."—Sir Joshua Reynolds. *Seventh Discourse.*

There prevails in many minds a certain amount of confusion between the ideas belonging to the words *teaching* and *learning*. They conceive them to be, if not synonymous, at least inseparable; and they regard a teacher as indispensable to a learner. In the application of art to photography this idea has received frequent promulgation, and the absence of special art tuition for photographers has been loudly bewailed The effect of these complaints from those assuming a knowledge of art has been the production of a vague want in the minds of many who know nothing of it, and who, knowing nothing, invest it with a kind of mystery not to be penetrated by the uninitiated. Nevertheless, they venture to ask, at times, How shall we commence the study of art? How shall we become acquainted with the wondrous arcana? Is it possible for the unlearned but humble votary to acquire the power of producing artistic pictures?

The study of art in its most most comprehensive sense is, doubtless, the work of a lifetime; but there are one or two initial truths which we wish to be clearly understood and thoroughly impressed on the mind of the student. First, that very little of art can be *taught*. Second, that the chief portions of art which can be taught consist in tolerably definite and simple rules and principles, easily understood and remembered, and not difficult to apply. And, third, that after the mastering of certain rules, art study chiefly consists in constant observation and appreciation of the beauties of nature and art, and in attempts to realize in *practice* these beauties, aided by the rules and principles before acquired.

First.—"The whole of every *science* may be made the subject of teaching. Not so with *art*; much of it is not teachable."* This arises from the fact that so much of art, especially in its higher aspects, belongs to feeling rather than knowledge. It can be educed, developed, cultivated; but not communicated. We might observe, that to some minds art education would be impossible, since in a certain sense the artist, like the poet, must be born, not made. But we do not dwell on this fact, inasmuch as we assume that none are likely to commence the study of art without some taste for it, from which we may further assume the capacity in a greater or a less degree; and admitting fully the existence of different degrees of natural ability, we protest strongly against the cant which relies on genius rather than effort, and affirm our conviction that nothing is denied to well-directed labour. But admitting all this, we again enforce the idea that much of art which can be learned by the student does not consist in lessons which can be taught by the teacher. The knowledge of the laws which govern production can be taught: but the faculty of producing cannot be imparted. That student has advanced very little indeed in art-culture who has not gone very frequently, both in his conception and his appreciation, if not in his production, of art excellence, far beyond anything which could be definitely taught in any series of rules or lessons on the subject. Our object in enforcing this position is to induce the student to depend more on his own sedulous self-culture than on the number of his lessons or the skill of his teacher.

Second.—That portion of art which can be taught consists chiefly of rules and principles readily accessible, tolerably simple, and not difficult to understand and apply. The rules for the painter relate to drawing, colour, composition, and chiaroscura. The two first are of comparatively little importance to the photographer, inasmuch as the drawing is produced for him; and, at present, colour is beyond his reach. On the subject of drawing, we may, in passing, thoroughly endorse the advice given by an able correspondent, signing "Respice Finem," in our last. Besides the motives given in his communication to induce the photographer to acquire a knowledge of drawing, we may remark, that without some knowledge of this kind he will be unable to perceive when, by mismanagement of lighting, he has produced the effect of bad drawing; when, by the use of short focus lenses for near objects, he produces false perspective; and when, as Mr. Werge so ably pointed out, his backgrounds violate all pictorial laws. But it is chiefly to a study of composition and chiaroscura the photographer must direct his attention. And here he will find much that is definite, clearly reduced to rule, and which can be acquired from the teacher or his lesson-book. There are various elementary works from which the necessary instructions can be gained: amongst the cheapest and most accessible are Howard's *Sketcher's Manual*, and the same author's *Imitative Art*; Burnett's works on *Composition* and *Chiaroscura* are excellent, but more expensive as well as more comprehensive. Most accessible of all to most of our readers, and especially adapted to their wants, as being written for photographers by a photographer, are the lessons of Mr. Lake Price on *Composition* and *Chiaroscura*, which appeared in our third and fourth volumes. Let the student master the principles and acquire the rules which relate to these questions at the very threshold of his art career; for here he is on firm ground, and all that relates to the arrangement and balance of lines and tones can be tolerably clearly stated. We have regretted at times to notice some, who have undertaken to write on the study of art in connection with photography, deride the idea of art rules, and, soaring into a region of æsthetic ecstacy, become lost in a cloud of words. Let not the student fear art rules where they relate to subjects which can be clearly expressed and practically illustrated. That cant which believes in genius rather than work generally repudiates rule and law. Sir Joshua Reynolds well remarks, "Every opportunity should be taken to discountenance that false and vulgar opinion, that rules are the fetters of genius; they are fetters only to men of no genius; as that armour which, upon the strong, is an armament and a defence, upon the weak and misshapen becomes a load, and cripples the body which it was made to protect."

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* Thompson's *Outlines of the Necessary Laws of Thought.*

Third.—After mastering those things which can be reduced to definite rules or clearly stated principles, art study chiefly consists in observation and practice, in which the knowledge gained is perpetually applied. This is the kind of study which, with the artist, has no termination, and in which he acquires that more exalted knowledge which cannot be so well put into words as expressed in work; which often transcends, whilst it never opposes, law. This study the photographer should be pursuing whenever he visits a gallery of pictures, and marks in what the beauty of each consists, and how it is produced. Whenever he enjoys the beauties of nature he may prosecute this study; and above all, in every picture he produces. Let him test every picture he takes by the knowledge he possesses, rigourously criticising his own work, first ascertaining whether it conforms to the lower technical conditions which can be reduced to rule, and then bringing it to the higher tribunal of æsthetical excellence, and ascertaining what of grace, expression, intention, and poetry it possesses.

But even in that higher region of culture, let the student remember that the conditions of success are neither arbitrary nor capricious, still less matters of chance. "It must of necessity be," observes Sir Joshua Reynolds, "that even works of genius, like every other effect, as they must have their cause, must likewise have their rules; it cannot be by chance, that excellences are produced with any constancy or any certainty; for this is not the nature of chance; but the rules by which men of extraordinary part, and such as are called men of genius, work, are either such as they discover by their own peculiar observations, or are of such nice texture as not easily to admit of being expressed in words. * * * Unsubstantial, however, as these rules may seem, and difficult as it may be to convey them in writing, they are still seen and felt in the mind of the artist, and he works with them with as much certainty as if they were embodied on paper."

The cultivated artist, when asked how he acquired his art-knowledge, will generally feel for a moment puzzled, and will next be tempted to say that it is chiefly a matter of intuition; that he possessed natural "taste." He has, of course, studied the rules of art; but he feels such a disproportion between his perception and feeling of art and its beauties, and the meagreness of the rules he was taught that he is tempted to fall back, especially if he have an illogical mind, on this idea of "taste." We counsel the young student to distrust this vague thing called taste, and acquire the more certain culture which comes from study and practice.

If the artist who has been thus questioned have a logical mind, his retrospective glance over the course ot his study brings him finally to a period when he knew nothing of art, when he only felt vaguely after it. He next acquired the knowledge which could be taught, and then proceeded to apply that; and it is by observation and practice, based on the half-forgotten rules, which have now almost become instincts, that he has acquired that art-culture which makes his judgment tolerably certain both in appreciation and production.

We will conclude by quoting a pregnant passage from Dr. Thompson's *Outlines of the Laws of Thought*, which admirably enforces the idea we wish to impress upon the student. "In a word, every art, from reasoning to riding and rowing, is learned by assiduous practice; and if principles do any good, it is proportioned to the readiness with which they can be converted into rules, and the patient constancy with which they are applied in all our attempts at excellence."

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Stray Papers on Photography.

No. 2.—THE GRADATION OF PHOTOGRAPHS.

BY NELSON K. CHERRILL.

The gradation of the colours in nature is a matter almost too obvious to need any remark. Yet, simple and clear though it may be to many that, in the words of Ruskin, "No colour exists in nature under ordinary circumstances without gradation," it does not seem that photographers are quite so much alive to the importance of this fact as they might be.

Thanks to the energy and labour bestowed on its advance, photography now holds an excellent position, and many wonderful results have been produced by its aid, some of which have been allowed, even by detractors, to rank as "gems of art."

But with all this progress there are many points in which improvement is yet needed, and among them the gradation of our pictures is one of the most important technical points, if we wish photography to rank as an art.

The reason for this will be evident from a little consideration. In photography, as it at present stands, we have to represent, by the most inadequate means, the whole range of colours belonging to natural objects—a range which can be but imperfectly rendered by a coloured painting, and less perfectly by an engraving.

But an engraving is more perfect than a photograph, in the present state of the art, by many important points.

1st. An engraving is or may be, at the wish of the artist, perfectly black and gradated up to pure white, having thereby a depth of colouring which has not as yet been reached by photography.

2nd. An engraving may have all or part of its gradations transferred to one or two particular passages of light and shade, thereby rendering some parts of the picture more effective in photography. On the contrary, all parts in focus in the same light have the same amount of detail rendered in gradation, and all these gradations must, from the nature of the action which forms the picture, commence from the highest, or white, and decrease in a regular and unalterable proportion.

We thus see that in engraving, though of course details cannot be rendered with so much truthfulness as in photography, they can be rendered in a way which may prove more conducive to pictorial effect. This arrangement can only be met by skill in the selection and lighting of the subject. The same effect cannot be produced by turning the lens out of focus.

In urging the superior depth of colouring obtained by engraving, a little explanation must be given in the first place.

The present state of photographic printing will scarcely allow of the whole required range of tone being obtained from pure black to pure white (*i.e.*, the white of paper, &c.) This ray cannot be obtained at all by albumenized paper, which photographers generally tone to a "rich warm brown;" but some of the new modes of printing—such as Mr. Swan's carbon prints, or Mr. Woodbury's photo-relief process—will, of course, by their nature, give any desired tone of black; and if they can be made as perfect in their gradation as photographic negatives, they will afford all the advantages that can be desired.

The present state of printing does not seem to afford the greatest bar to the obtaining of the utmost perfection in the results.

The collodion process itself has limits beyond which it cannot be pushed. The number of natural tones which may be rendered on one plate by photography—that is, on one negative—is only about one half of the required number. We cannot take a fine sky, containing the higher forms of gradation, on the same plate with a dark massive foreground, using the same exposure—that is, without using some form of mask.

It is a great question whether any form of mask or shade can be used with advantage in taking sky; indeed, it is scarcely probable that, in taking any view, the sky is, at the moment of exposure, the one best suited to it. It is said that Turner's skies, especially those at sunrise, were taken from the pier at Margate.

But to return to our point. There is another way in which photographs fall short of the productions of those artists who are not dependent upon mechanical appliances. It is this: in a photograph, the tone of any object bears a certain fixed relation to the tone of any other in the same picture. For example, suppose a dark cottage wall, covered with ivy, is, in any photograph, twice as black (in any one spot) as the sloping roof above it. Now, beyond a very slight modification produced by a change of collodion, &c., and that probably at a sacrifice of some other feature in the picture, we cannot alter this relationship. I do not wish to enter into any question as to the desirability of altering the tones and gradations of objects in making pictures of them; but one point seems worthy of note, viz., that you would entirely spoil a finished engraving by altering the "depth" of any part of it of considerable size. Is it, then, likely that if you could find the original subject, and photograph it from nature, each tone, shade, and gradation could be made to have exactly the same depth as the corresponding one in the engraving?

The question, then, naturally arises, how is the most perfect gradation to be secured by photography?

In answer to this question, I would suggest, first, that the developing solution used be such that the image shall require *no* after intensification. I have had occasion to dwell upon this point in another paper suffice it; therefore, now to remark that, if the solution used does not give detail to the image as fast as the density increases, the gradations in the picture cannot be in true and proper relation to each other; and, secondly, that too much should not be attempted on one plate.

Photography is limited, and to attempt more than a certain amount upon any one plate is only to effect a compromise—to sacrifice some part of the picture for another. Double printing is easy enough, and, if used with judgment, may be made to produce effects both true and artistic.

As a rule, only two negatives would be required for each subject; but of course this remark will only apply to those who wish to make pictures as well as photographs.

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LIGHT FOR THE STUDIO.

We will, if you please, pay a visit to a panoramic exhibition; not that we care to see the pictures, but I think we may study the system of "lighting" to some advantage. Having taken our seats, we observe three things. First, that the picture before us is brilliantly illuminated; secondly, that the source of light is carefully concealed; and, thirdly, that the audience are in almost utter darkness.

We will now light, say, a dozen jets of gas in different parts of the room, and what is the result? The light, falling between the audience and the picture, has considerably marred the beauty of the latter; it looks comparatively tame and foggy. Turn out the offending lights, and its brilliancy is instantly restored.

Now, sir, I cannot help thinking that unless we apply this principle of lighting to photographic studios, we do not give our lenses fair play. The conditions are the same: illuminate the sitter; remove all diffused light between him and the lens; and keep the camera in darkness. The question is, how can it be done? That question, with the aid of a few diagrams, I will endeavour to answer.

Fig. 1.

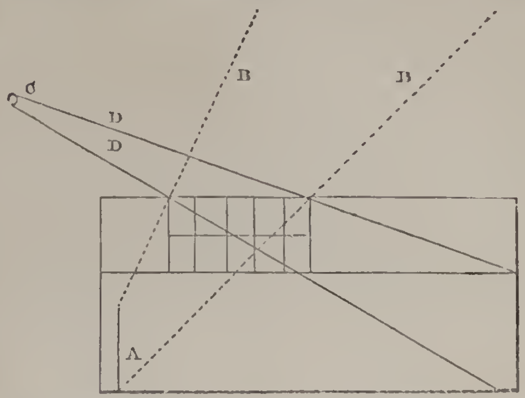

Figure 1 is a longitudinal section of an ordinary ridge-roof studio, 30 feet long, 9 feet high to the eaves, and 5 feet from level of eaves to ridge, making in all 14 feet. Six feet from the background, over the head of the model, is opaque The skylight is 10 feet long, and the remainder of the roof is opaque. A is the model, 6 feet high, and the dotted lines, B B, drawn from his head and feet, and cutting the roof at the extreme ends of the skylight, show the quantity of "direct" light he is capable of receiving from that source; C is the sun, who very unceremoniously floods the camera end of the studio with his rays (D D), tormenting the unfortunate operator almost beyond endurance. A quantity of light also descends vertically into the room. This and the sun constitute the dozen jets we saw lit between the audience and the picture, and which, in the next diagram, we will endeavour to "put out."

Fig. 2.

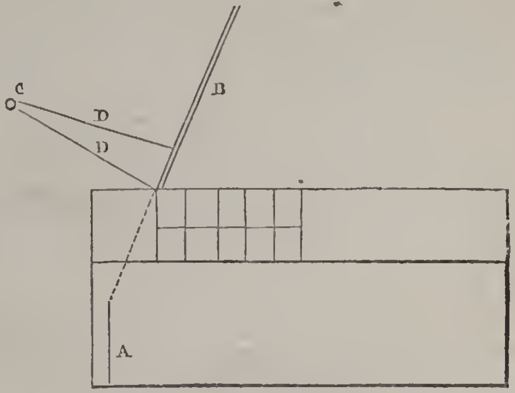

Figure 2 is similar to fig. 1, with this exception, the dotted line B, from the head of the model, through the skylight, which was only imaginary in fig. 1, has become an opaque sunshade, or shield, which effectually prevents the sun from entering the studio. As it is carried up to a point exactly above the extreme end of the skylight, it also cuts off the whole of the vertical rays which fell upon the floor, and being reflected in various directions, did their best to destroy the brilliancy of the picture: in fact, a number of the obnoxious "jets" are extinguished without in any way interfering with the direct north light which still falls upon the model at the same angle as at first.

If this method of lighting is good for the skylight, it is also good for the side lights (I mean windows in the sides of the studios). Shade these in the same manner, being careful not to interfere with the direct north light, and the lens, no longer having to fight its way through a fog to get at the model, will gratefully express its sense of relief by the increased brilliancy of the image projected upon the plate.

Fig. 3.

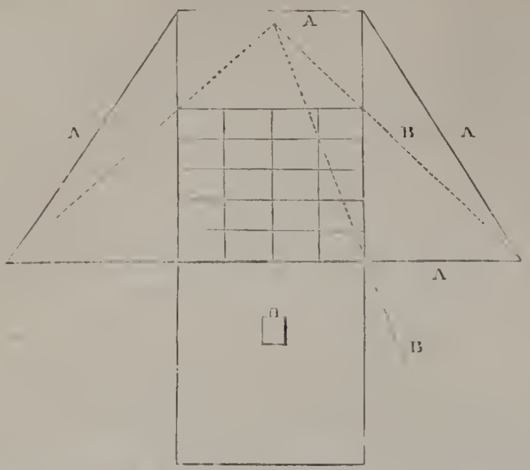

Figure 3 shows the shape of the roof shield (A A A A), and also the angles of the side shields and their distance from the house. These may commence at the south end of the studio, or at the junction of the dotted lines with the skylight. B B show the angle of direct side light falling upon the sitter to be exactly the same as if the shields were not there.

To carry this plan out in its integrity, a plot of ground 37 feet by 30 feet would be required. Where this is not available, the top shield alone may be used.

It is generally admitted that a high wall behind the sitter is advantageous, and why? Because it keeps the sun away. Upon this principle the accompanying design is based. The top shield may be looked upon as a wall bent over the studio. No upright wall could be built high enough to have the same effect; viz., to intercept the whole of the vertical rays. The side shields may be considered as walls bent at an angle to intercept the direct rays from east and west, which, coming in from those points, illuminate, not the model—they cannot reach him, but by reflection—but the floor and sides of the studio, and may be looked upon as a blaze of light between the camera and the model, which the lens must pierce before it can reach the latter. I think the direct light which falls upon the sitter from the north will produce the most perfect pictures possible; but those who prefer a light from east and west as well can glaze the whole of the shields, making them part of the studio, and shut out the sun with opaque blinds.

I think it is a great mistake to permanently close the background end of the studio, because an opaque blind will always do that, and many good effects upon the background can be secured, especially if it be only held by a cord at the top, passing through a block; this will allow it to be inclined at any angle. R. A.

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EXPERIMENTS OF SIR DAVID BREWSTER AND HELMHOLTZ ON THE SOLAR SPECTRUM.

BY OGDEN N. ROOD,*

Professor of Physics in Columbia College.

The process of taking a photograph may be considered as a twofold one; first, certain moderately well-understood optical principles are called into play, whereby a more or less perfect optical image of an object is produced; after this has been done, certain chemical laws are set in action by the photographer, by which some of the features of the optical image are seized on and recorded. Our knowledge of the latter set of conditions is still very imperfect, though we may hope from results lately obtained by such investigators as M. Carey Lea and a few others, that we shall not always remain in this ignorance.

Hence, very naturally, photographers have always felt a certain curiosity with regard to the construction and optical properties of their lenses, and not a few have extended this interest to the subject of light itself.

It is my object in this communication to give a short account of a very remarkable set of experiments on the solar spectrum, made a few years ago by one who may probably, with justice, be regarded as the greatest German physicist now living. This investigation, for reasons that will presently be evident, attracted at the time some attention in England; but, so far as I know, it has received no notice at all in this country, and I have met only a few American scientific men who had even heard of it, although some of the experiments described are very beautiful as well as striking, and can easily be repeated by any one.

Sir David Brewster, who, until his most unfortunate controversy with Wheatstone respecting the stereoscope, was almost universally regarded as the first living optician in England, published, in the year 1831, the results of his analysis of solar light. Owing to the well-earned fame of this distinguished man, as well as to the new and startling facts adduced, this paper attracted much attention, and the views there laid down seem to have been pretty generally adopted in England, as well as on the Continent. They shortly found their way into all the text-books on Optics and Physics, where they still remain, for the most part uncontradicted.

The conclusions deduced by Sir David Brewster from his experiments were as follows:—1st. That the solar spectrum consisted of three primary colours only, they being red, yellow, and blue; 2nd. That these three kinds of light exist at every point of the solar spectrum with a variable intensity. He contended that the red, for example, overlaps the yellow, and, by mixture with it, produces the orange; and that by the joint presence of the red and blue the violet at the end of the spectrum is generated. Further, that the yellow rays, by their extension into the blue space, produce, by mixing with the blue rays, light of the colour termed green, &c. Brewster was led to this theory by studying the effects produced by plates of coloured glass on the solar spectrum, the latter being generated by a single triangular flint glass prism. He contended that the eye itself gave evidence of the existence of red light in the red, orange, and violet spaces, and that by passing the indigo and blue rays through olive oil, these rays became of a violet hue, thus rendering evident the presence of the previously disguised red rays. By the same kind of reasoning and similar experiments with cobalt glass, port wine, pitch, and balsam of Peru, he satisfied himself that yellow and blue light also extended throughout the entire spectrum.

As a necessary consequence of this theory of Brewster, then followed the somewhat singular conclusion, that there were red rays having very various and widely different degrees of refrangibility, or, in the language of the Wave Theory of Light, that large differences in wave length were unaccompanied by any change in colour. To put this in other words, Brewster in effect reached the strange conclusion, that the sensation produced by the impact on the retina of waves of light of a certain length was what we term red; that waves of exactly the same length produced the sensation of yellow; while, finally, the sensation of blue was the effect produced by a third set of waves, identical with both the others in length. Brewster's views were ineffectually attacked by Airy, Draper, and Melloni; they were presently adopted, introduced into most text-books on physics, and are still held by most educated persons in this country.

In the year 1852, Helmholtz, in Germany, took up this subject, and, after making an elaborate set of experiments, showed in the plainest manner that the spectrum employed by Brewster was not pure, and that many of the results obtained by him were thus to be accounted for. To obtain a pure spectrum, Helmholtz first formed a spectrum essentially in the same manner as Brewster; viz., by allowing sunlight to fall on a triangular flint glass prism; but instead of using this spectrum for observation, as Brewster had done, he first purified it by isolating particular rays, and refracting them by a second triangular prism of flint glass. When a pencil of pure spectral rays had thus been isolated and purified—say, for example, the green rays—they remained green, though transmitted through plates of variously coloured glass; this operation merely diminished their brightness, but produced no effect on their tint.

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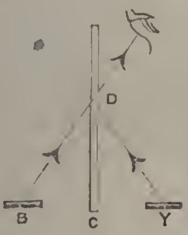
* *Philadelphia Photographer.*

The spectrum obtained by Helmholtz was so pure, and the diffused light generally present was so completely cut off, that he was actually able to trace with his eye, unassisted by fluorescent substances, the ultra violet, or, as they had previously been termed, invisible rays, which, as is well known, are powerful agents in doing photographic work.

Helmholtz also showed that other results obtained by Brewster were owing to contrasts; as, for example, where a bright red space was in contact with a much darker red space, the latter often appeared greenish.

Helmholtz then showed that by mixing the blue light of the spectrum with the yellow light, a white or purplish tint was produced, but in no case green. He proved also generally that in no case does a mixture of pure blue and pure yellow light produce green, but always tints more or less like those above mentioned, contradicting thus an opinion that is more than a thousand years old. He described a very beautiful way of combining the tints from pieces of coloured paper: A plate of clean good glass, one inch in width, is supported as seen in the figure, and one of the coloured pieces of paper is viewed through it; the other is moved till its reflected image is made to coincide with and to overlap that seen through the plate of glass directly. Some samples of blue and yellow paper may thus be made to combine to a tolerable white, by properly regulating the relative intensity of the two images; this latter condition is attained by altering the distance between the pieces of papers. I send with this, samples of blue and yellow paper which gave a pretty good result, when the distance D C is made two and a half the distance B Y, the yellow paper being seen as indicated by reflection.



Another simple way of showing these experiments is to prepare circular discs of white cardboard, and to divide them up by pencil lines into sixteen sectors, painting eight alternate sectors with ultramarine blue, the other eight with chrome yellow. When a disc of this kind is merely held in the hand by a pin thrust through its middle, it can, by a slight tangential blow, be made to rotate fast enough to combine the colours. I inclose a circular disc of this kind, consisting of blue and yellow sectors, which by rotation gives a sort of a flesh tint, but no approximation to a green. By varying the size of the sectors, either tint may be made to preponderate. It is true, in this mode of experimenting, that the two tints are presented in rapid succession, but not simultaneously, to the same portion of the retina; but nevertheless, as has been proved by experiment, the result is the same in both cases.

Among other remarkable results, Helmholtz found that the red of the spectrum with the green of the spectrum gave not white light but yellow light; also that the green and violet of the spectrum gave a pale blue. The former of these two experiments I repeated a day or two ago with success, and showed it to some persons who happened to be present.

It will now be asked, is all this not most positively contradicted by the experience of every child with its box of toy paints, as well as by the ripe knowledge of all artists, who, as we are told in books on colouring, "generally prefer to compound their greens from blues and yellows?" The theory proposed by Helmholtz to account for this apparent contradiction is as follows: Light reflected from a painted surface is of two-fold kind; 1st. That which comes directly from the surfaces of the little atoms of coloured powder; this will, in ordinary day-light, be white, and small in amount. 2nd. That light which penetrates through two or more atoms of the pigment, and then is reflected; this is always coloured, and coloured merely because, in its passage through the atoms, certain rays have been absorbed. For example, the white light which penetrates through an atom of ultramarine in this operation becomes deprived mainly of the red, orange, and yellow rays; the green, blue, and violet rays are left comparatively unweakened. The particles of chrome yellow, on the other hand, in the same process absorb the blue and violet rays, reflecting back the red, orange, and green rays. Hence it will be seen that by the joint action of the ultramarine and chrome yellow, all the rays of the spectrum are absorbed except the green; hence green light alone is reflected back to the eye. This theory I have lately tested by experiment; narrow strips painted with chrome yellow, ultramarine, and the green produced by their mixture were brought at the same time in front of the slit of the spectroscope, and it was found that their spectra had been acted on in the manner anticipated by Helmholtz.

In some cases the resultant tint produced by mixing oil or water colours, is identical, or nearly so, with that obtained where coloured rays of light are mixed; in other cases the results differ more or less, though the most striking examples of difference have been pointed out in this article.

In mixing the rays from coloured papers by the method of rapid rotation, much trouble will be saved by constructing a simple whirling machine, the ratio of the diameters of the two wheels being as 1 to 25, when it will not be necessary to divide up the paper into sectors, but a series of circular discs of uniform tints can be used, each having a slit cut from its centre to its circumference. Two discs can then be combined by the aid of these slits, and the relative amounts of the tints can be varied at pleasure, so that with two discs thus prepared a hundred experiments may be made.

[Professor Rood's remarks are strikingly illustrated by the specimens sent. The blue and yellow sectors, when mixed by revolution, do not form green, but reddish-gray, without the faintest green tinge.

Helmholtz's views have very recently received a striking confirmation in the helio-chromic experiment of Niepce de St. Victor. This physicist has shown that mixtures of yellow and blue never comport themselves optically like true green. That the green of the spectrum impresses his color-plate with a green image, whereas a green produced by mixed yellow and blue gives, first, a blue, and then a yellow image—never a green.]

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Recent Patents.

PHOTO-MEZZOTINT, PHOTO-ENGRAVING, PHOTO-LITHOGRAPHY.

BY JOSEPH W. SWAN.

The first part of Mr. Swan's patent relates to the process in dispute between himself and Mr. Woodbury, upon which it is unnecessary for us to comment. The remaining portions refer to an important process of photo-engraving, of which we have already seen promising results, and to a method of producing a photograph in which the gradation, being broken into points, affords facility for the production of photo-lithographs with half tone. The extracts from the specification are necessarily lengthy, but the importance of the subject will justify the amount of space occupied. It proceeds as follows:—

My invention relates to improved modes of producing, by means of light, sunken or raised printing surfaces, and also lithographic or zincographic printing surfaces, and also to an improved mode of printing from sunken or intaglio printing surfaces. By means of this invention I obtain, amongst other advantages hereafter noted, prints possessing more perfect gradation of light and shade than has hitherto been secured by means of photographically produced plates, blocks, or other printing surfaces.

Photomezzotint.—To produce a photographically engraved plate adapted to a style of printing which I afterwards describe under the denomination of photo-mezzotint printing, I proceed as follows:—I produce an image by means of bichromated gelatine and colouring matter as described in the specification of my patent, dated Feb. 29, 1864. No. 503.[*] In applying the process described in the patent referred to for the purpose now contemplated, I obtain, amongst other advantages, that of governing the depth of the lights, penetration into the film of sensitive gelatine, as a consequence of the mixture of a pigment or colouring matter with the gelatinous solution from which the sensitive film is produced. For the present purpose I mount the gelatinous tissue after it has received the actinic impression, and previous to its development (as described in the above-mentioned patent), upon a surface of state, glass, or other suitable material. Or, instead of producing the actinic impression upon the gelatinous tissue, and by means of the superposition of a negative, as described in the patent referred to, I produce it by means of the camera, and in this case I do not use the tissue described in my patent of February 29, 1864, No. 503, but instead of it I employ a plate of glass coated on one of its surfaces with a solution of bichromated gelatine and pigment similar to that employed in the preparation of the gelatinous tissue as described in my patent of February 29, 1864, No. 503, the surface of the glass to be coated with the gelatinous solution being previously coated with a thin film of caoutchouc or coagulated albumen. Before using the plates prepared in this way, I dry the gelatinous coating, and in producing the actinic impression upon it, I place the uncoated surface of the glass towards the light transmitted by the negative and camera lens. I develop the actinic impression produced on the plate as above described, or on the tissue as described in my patent of February 29, 1864, No. 503, by subjecting the gelatinous coating or film to the action of warm water, so as to dissolve the soluble portions. After development I surround the plate bearing the gelatine image with a wall or rim, usually of metal, which, being a conductor, or rendered a conductor, of electricity on its inner surface, becomes coated thereon with copper; when the image is electrotyped, and by the deposit of copper uniting with that formed on the image, rigidity is imparted to the electrotype, and liability to warp during its formation (which is a difficulty hitherto experienced in taking electrotypes from gelatine photographs) is thereby removed. Before placing the gelatine image in the electrotyping vat I act upon it with a solution of a protosalt of iron, or with a solution of sulphate of alumina, with a view to surface hardening, and while wet I produce upon it, by chemical decomposition, a coating of silver; or I otherwise render its surface electrically conductible. I then submit it to the electrotype process, and obtain a counterpart of the gelatine image in copper. After the removal of the electrotype from the vat, and its disengagement from the gelatine image, in order to strengthen it I fill in upon the back with soft metal other suitable backing to the level of the top of the rim or wall.

The electrotype plate, produced as above described, I use for what I term photo-mezzotint printing, which is performed as follows:—I grease the surface of the electrotype by means of a stiff brush, or in any convenient manner; I then pour on it a sufficient quantity of slightly warm gelatinous ink, composed of water, china ink, or other suitable colouring matter, and gelatine in sufficient proportion to cause the ink to solidify on cooling; over the ink I place a piece of paper, and then apply an even pressure to the back in such a manner as to cause the gelatinous ink to spread over the entire surface of the electrotype, fill up all its recesses, and displace the excess of ink (over and above what is required to fill up the recesses) from between the under surface of the paper and the upper surface of the electrotype; I maintain the pressure until the ink is solidified, and I then remove the paper, which carries with it the print. I prepare the paper for photo-mezzotint printing by coating its surface with gelatine, collodion, albumen, or other substance suitable for preventing colouration of the paper in the high lights of the print. The press which I employ for giving the impression to the printing paper is fitted with a thin steel or other metal plate, which forms a kind of elastic tympan, and serves to impart a gradual pressure (commencing, say, at the middle of the paper) and extending to the margin so as to spread the ink over the copper-plate and cause the excess of ink (if any) to exude between the paper and plate at the ends or margin thereof. This plate may be conveniently fitted to the under side of a rigid flat plate forming the fixed head of a press, and the electrotype plate may be raised up to impart the impression to the paper by means of a screw and hand wheel. The flexure of the plate may be produced either by a weighted lever acting on a plunger at the back of the steel plate, or by springs placed between it and the fixed head, which springs are capable of receding into recesses formed in the under face of the fixed head; or the elastic plate may have a curved "set," its ends being left free to allow of its flattening under pressure; or this elastic plate or tympan, either with the curved "set," or curved by pressure from behind, may be fitted to a rigid flat plate hinged to the bed of a press, and capable of receiving pressure either by hand or mechanical means. With the view of fixing the prints thus obtained—that is, of rendering them not liable to injury by water or moisture—I subject them to the action of a solution of alum, or its equivalent as respects the property of rendering gelatine more or less insoluble in water; or the same effect may be obtained by introducing a suitable fixing chemical into the gelatinous ink.

Photo-Engraving.—To produce a photographically engraved plate adapted to ordinary copper-plate printing, and capable of rendering inversely and in graduated tints the lights and shades of an ordinary photographic negative, I proceed in the same manner as has been above described for the production of plates for the photo-mezzotint style of printing, with the following differences: viz., first, in producing the gelatine relief, which constitutes the matrix of the engraved plate, I add an increased quantity of pigment or colouring matter to the bichromated gelatine so as to diminish the depth of penetration of the high light in the act of printing the actinic impression upon it. I thus control the height of relief in the gelatine matrix, and consequently the depth of the engraving of the electrotype cast taken from the matrix; second, I omit the use of the metallic rim or wall; and third, I guard against the removal of the printing ink from the recesses of the plate in the act of wiping, by forming in the recesses numerous extremely thin walls, the tops of which are in the same plane as the face of the plate. The walls may be either in one series of parallel and equi-distant lines, or in two or more series intersecting each other. The single series of walls gives to the recesses of the plate a trenched structure, while two or more series gives them a cellular structure; or where the trenched or cellular structure of the recesses is objectionable, I give them ink-holding capacity by forming therein numerous spikes or points which terminate in the plane of the face of the plate. To produce a plate with the trenched cellular or spiked recesses, I form in or upon the negative of the object to be engraved numerous opaque lines or dots extending over its entire surface, the lines or dots being equi-distant, or nearly so; or I produce the said lines or dots in the film of collodion or albumen upon which the chromo-gelatine tissue or coating is formed. I obtain the opaque lines by taking in the ordinary way a photographic negative of a plate of glass coated with an opaque etching ground, and having the required series of lines drawn upon it with a point, by the aid of a ruling machine or otherwise, the point cutting through the etching ground to the surface of the glass. The lines are drawn closer or more open as may be deemed necessary for the kind of work to be done, and the amount of reduction to be made in the size of the negative produced from them. I obtain the opaque dots by taking (in the ordinary way) a photographic negative of a dark screen, perforated with numerous minute holes, equi-distant, or nearly so; or I obtain the dots by means of fine particles of pulverulent opaque matter, either dusted upon the negative of the object to be engraved, or applied thereto by means of a solution of gelatine or other suitable vehicle having the said fine particles of opaque pulverulent matter diffused through it. The actinic impression having been obtained by the use of the negative prepared as above described on the gelatine coating or film, and developed by means of warm water, as described above, I treat it with a solution of alum, or a protosalt of iron, with a view to indurate the gelatine image; I then render its surface electrically conductible as above mentioned, and produce therefrom a copper plate by the electrotype process. This plate I use in the ordinary manner of a copper-plate engraving, except that in printing from it I employ an ink of such transparency or weak colorific power as to yield prints possessing gradation of light and shade proportional to the different depths of the recesses of the engraved plate.

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[*] The carbon process patent.

PHOTOLITHOGRAPHY.—That part of my invention which relates to typographic and lithographic printing consists chiefly in the production of what I term a crayon photograph; that is to say, a photographic image in which gradation of shade is produced by dots of opaque matter, more or less aggregated as the shading is darker or lighter, and therefore corresponding to a crayon drawing in the principle on which the gradation of shade is produced. In an ordinary photograph gradation of shade is continuous, and is produced by thicker or thinner strata of semi-opaque coloring matter. Surface printing is not capable of rendering this kind of gradation of shading, but it can give the granular or dotted gradation which characterises the crayon drawing. I therefore convert by photographic means the continuous gradation, such as an ordinary photograph possesses, into the granular gradation similiar to that of a crayon drawing. The crayon photograph may be produced in various ways.

The following are the methods which I prefer:—I make a solution of gelatine, and add to it bichromate of potash or ammonia, or other suitable compound of chromic acid, and also a certain proportion of charcoal or other opaque substance, in such a state of division or granulation, that when diffused through the gelatine solution, and spread upon glass in a thin layer, the opaque particles will show distinct granularity with interstices between particle and particle.

In using the above-mentioned gelatinous solution, I spread it upon a level surface of paper, glass, or other suitable substance. (When glass is used to receive the gelatine, it is previously prepared with oxgall, or otherwise, to facilitate the stripping of the sheet therefrom previously to its being used in the printing frame.) The coated surface is suitably placed for rapid drying, and guarded from the action of injurious light. Where the gelatine tissue is not required for immediate use, I prepare it on a basis of paper, and omit the bichromate in its preparation; and when required for use, I render such tissue sensitive by impregnating it with a solution of the bichromate salt. When the sensitive gelatinous sheet is dry, I place it in a printing frame beneath an ordinary photographic negative or positive of the object to be printed. In doing this I put that surface which was uppermost during the solidification of the gelatinous solution next to the negative or positive plate; I then expose the printing frame to light in the usual manner, taking care that the incidence of the light is at right angles with the plane of the photographic surfaces; after exposure I remove the tissue from the printing frame, and coat its actinically impressed surface with a solution of caoutchouc and dammar in benzole; I also coat a plate of glass with the same solution, and, having allowed the solvent to evaporate, I press the two coated surfaces together to effect their adhesion. After mounting the tissue on the glass in the manner above described, I subject it to the action of warm water, so as to dissolve away those portions of the gelatine which have not been rendered insoluble by the action of the light. Instead of producing the actinic impression by the superposition of a negative or positive as above described, I sometimes obtain it by means of the camera, and when operating in this way I form the chromo-gelatine coating on glass in such manner that the particles of opaque matter are fewest and smallest next to the glass, and increase in size and number towards the exterior surface of the coating; this I am enabled to do by inverting the glass while the gelatine is in a fluid state. When the opaque particles are thus destributed through the gelatine coating, instead of removing it from the glass I expose the coated plate (when the gelatine is set or dry) in the camera, placing the uncoated surface of the glass towards the light. The impression obtained is developed by means of warm water, as in the case of the tissue mounted on glass after exposure.

The crayon photograph may also be produced by diffusing the iodide, chloride, or bromide of silver in a granular or pulverulent form through collodion, albumen, gelatine, or other suitable vehicle, the image being obtained in the usual manner, and either in the camera or in the printing frame. Another mode of forming the crayon photograph is by dusting the charcoal or other granular opaque powder upon a photographically impressed surface of such character that, by exposure, its hygroscopic properties have been modified in different parts by light transmitted through a negative or positive photograph. The means of producing such surfaces are well known.

Having obtained the crayon photograph in the manner above described, I employ it instead of an ordinary negative or positive photograph to produce, with the aid of any of the well-known processes, a typographic, lithographic, or zincographic printing surface.

Having now set forth the nature of my invention of "Improvements in the Production of Printing Surfaces by Photographic Agency, and in Obtaining Prints therefrom," I claim with respect to the photo-mezzotint process—

First, the improvements above set forth in producing the printing surfaces, and in obtaining prints therefrom.

And, secondly, the means above described for removing from gelatine prints the liability to injury from contact with water or moisture. With respect to the copper-plate system of printing, I claim the process above described for producing the ink-holding printing plates.

And, lastly, with respect to typographic and litho or zincographic printing, I claim transmitting the continuous gradation of shade peculiar to the ordinary photograph into an equivalent of the granular shading peculiar to a crayon drawing, as above described, for the purpose of obtaining printing surfaces.

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ARTISTIC COPYRIGHT.

A MEMORIAL has been addressed to the Council of the Society of Arts, signed by between one and two hundred of the principal artists, to the following effect:—

GENTLEMEN,—We, the undersigned, artists, engravers, and publishers of works connected with the fine arts, are desirous of bringing under your notice the present very defective state of the "Engraving and Artistic Copyright Acts," and do respectfully request you to give the subject your serious consideration, with a view to the speedy amendment of the said Acts, and to use your earnest endeavours to prepare such a Bill as shall fully meet the present emergency, and give to proprietors of copyright in works of fine art that effectual protection which it was doubtless the intention of the legislature to have secured to them by means of the aforesaid Acts.

We would at the same time suggest that the various international copyright treaties appear to demand that the new Act should be, as far as practicable, assimilated to the French law, which is found to work exceedingly well, and to be in France a most effectual bar to piracy.

We would further submit for your consideration that the invention of photography having placed within the reach of all a process whereby every variety of design may be cheaply and indefinitely reproduced, the piracy of copyright engravings has for the last few years been carried on in the most unscrupulous and open manner, particularly by persons who employ hawkers to carry their illicit productions from house to house, being thus able to sell them at a very cheap rate, to the great and manifest injury of the proprietors of the copyright in such engravings.

In those cases, in which the persons so offending have a fixed abode, we would endeavour to obtain a more speedy and summary remedy than is provided by the existing laws, and in case of hawkers, who move from place to place and act merely as agents, refusing to give the names of their principals, we would also pray that such means might be devised as would bring these also under the power of the law.

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Proceedings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL MEETING was held at 12, York Place, Portman Square, the Right Hon. the Viscount Ranelagh in the chair. The minutes of the last meeting having been read and confirmed, the following members and subscribers were proposed and elected:—Rev. T. R. Valpy; Col. G. Halpin; Mrs. J. C. Ryle; E. Wilmot, Esq; W. S. Shirras, Esq; J. H. Sclater, Esq; L. Ashburne, Esq; W. Green, Esq; Miss Banks; H. Smith, Esq.; Joseph Guyton, Esq; John L. Riley, Esq; J. A. Jobbing, Esq.; F. P. Barlow, Esq; Lord Clermont.

The Secretary then laid before the meeting mounted copies of all the prize pictures, together with the prizes for each. They consisted of eight silver goblets, six very large and handsome albums, with silver name and inscription plates, and seven similar albums of a smaller size, making altogether upwards of seventy pounds' worth of prizes for this year's pictures.

The Council expressed their unqualified approval of the prizes, especially the larger albums, which were much admired.

The Secretary then read a long letter from Capt. G. Bankart, drawing the attention of the Council to the inconvenience of calling the Society's negatives early in the summer, and suggesting that they should rather be called in the autumn of the year, as much more convenient to members. It was, however, decided by the meeting, after a discussion, which occupied a considerable time, in which Capt. Bankart's arguments were carefully weighed, that whilst admitting that there were many serious inconveniences attending the present arrangement, still more would result from the change which was recomended, owing to the great difficulty of printing from the negatives during the winter months. The Secretary moreover stated that already Capt. Bankart's wishes were met halfway, as, although the negatives were asked for by the first of June, the list was in reality kept open until nearly the end of July. The Secretary was directed to reply to Capt. Bankart in accordance with the decision of the Council.

The Secretary then laid before the meeting certificates of Honorable Mention which had been awarded, and they were signed by the Chairman.

The proceedings then terminated.

A. G. Melhuish, Hon. Sec.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, February 7th, 1866.

At the free lectures at the Sorbonne, which have become so popular, there are few evenings on which photography does not come under notice, and prove the services it renders to science. The other evening, M. Hatton de la Gonpillière, in relating the history of steam engines, showed to his astonished audience amplified pictures, so taken that the machine, being reproduced by a fixed picture, and the pistons, fly-wheels, safety-valves, and cog-wheels by a moveable picture, the movement of each piece is imitated by a means analogous to phenakisticope system. However, the demonstration will be still more clear and complete if our good friend Mr. Claudet definitely realizes the application which he has already studied with so much fruit.

M. Lecoq, a Professor of the Faculty of Clermont, in delivering a lecture at the Sorbonne on the Volcanoes of Auvergne, exhibited some very fine photographic pictures executed by M. Bardin, chief of the topographic works at the Polytechnic School, and in which is given the height of the mountains every ten metres.

I think I have already spoken to you of the splendid views of Switzerland obtained last summer on rapid albumen by M. Ch. Soulier. I have just been examining a new collection of them, and I do not believe that anything more perfect has yet been produced by any process. These images are every way exquisite; but that which strikes one most is the animation imparted to them by the persons who are taken almost instantaneously, by the presence of clouds, &c. M. Soulier employs Dallmeyer's triplet, and a new mode of development. Although unable to give me the formula, on account of the arrangement made with his successors, he made a remark which deserves noting. "This developing process proves to me," he said, "what I had always suspected, namely, that the image is always formed instantaneously upon the dry sensitive layer, properly prepared, and that the only difficulty lies in developing it."

Your readers are acquainted with M. Truchelut's process for transfer upon painter's canvas, described in your journal a few months back. I have just seen some of the pictures executed by this artist, and must declare that they are really very remarkable. Not only is the design clear, vigorous, and well-modelled, but it evidently forms one body with the preparation of the canvas, and thus offers sure guarantees of permanence. It may be not uninteresting to some of your readers to learn that M. Truchelut is disposed to grant permissions for the use of his patent in England.

I take from the *Traité des Insuccès en Photographie*, just published by M. Cordier, a few extracts, giving your readers an idea of the useful information to be found in the work.

Feeble and greyish pictures.—Negatives too uniform; paper coated with albumen too much diluted; pictures not sufficiently printed; or left too long in the *châssis* with a feeble light; washed in water before exposure; gold bath yellow—that is to say, too acid; toning pushed too far; left too long during cold weather in a gold bath that has not been slightly warmed; fixed with cyanide of potassium instead of hyposulphite; a too-prolonged use of the bleaching liquid already indicated.

Pictures which are slow in printing, granulous, of a dull red on leaving the châssis.—Paper not sufficiently salted: this may be rectified by dipping the paper for an instant in a filtered mixture of 100 parts of alcohol and 4 parts of white pulverised ammoniacal salt. Silver bath too feeble, especially if the paper has not been in contact with it long enough. Old albumenized paper kept in the damp; for in this case the chlorides, and especially the sea salt, end by quitting the albumenized surface and entering into the body of the paper: you may rectify this by re-salting the paper. Sensitized paper exposed to damp and then to frost; the nitrate eats away the underlying chloride.

Toning not uniform, or worthless.—Paper strongly or irregularily albumenized, or insufficiently salted; *cliché* too feeble; contact with the silver bath too short; acid turnsol silver too feeble; toning not pushed far enough; chloride of gold adulterated; gold bath exhausted, or too alkaline, or made with solutions mixed too long before being used; too low a temperature, which should be obviated by slightly warming the gold bath in winter; sheet badly washed before the toning, or washed in water containing chlorides.

Pictures which lose their toning in hyposulphite.—Feeble pictures made with a negative too transparent, or not made dark enough in the *châssis*, or insufficiently washed after the toning; gold bath with an addition of acetic acid, in which case the picture has a tendency to lilac red; feeble gold or silver baths.

Reddish-black spots.—If hyposulphite gets upon a nitrated picture, or if, in the toning, the sheets are touched with fingers impregnated with hyposulphite, there is a formation of black sulphide of silver. An imperfectly dried picture left long under the negative; damp blotting paper or flannel in the *châssis*, by which both pictures and *clichés* are spoilt; dirty finger marks, arising from incautious handling of the sheets before their employment; marks of scratching in the *cliché*, which require to be blackened beforehand upon varnished *cliché*. It is easier afterwards to retouch the positive picture with black than with white.

I do not know whether you have a similiar work in England; here it was a desideratum, and will render real service.

Ernest Lacan.

THE ORGANIC IRON DEVELOPER.

Sir,—Though it is not my intention to enter into any controversy with the *British Journal* on the subject of my paper read before the London Photographic Society, it may not be out of place to call attention to the leading article of that journal for January 26, 1866, on what it terms the "ferro-gelatine" developer; and as all the statements contained in that article, which have reference to my paper, admit of a satisfactory answer, I propose to consider them in the order in which they occur, quoting the passages requiring notice, and adding a brief answer to each.

1. The *British Journal* says:—"Omitting in the meantime—because it would occupy too much space—to show the improbability of his assumption that certain compounds which he names are produced by the action of diluted sulphuric acid on gelatine."

The only substance mentioned in my paper as formed by the action of acids upon gelatine is "glycocine;" it would be difficult to show the "improbability" of this result.

2. It adds: "We admit that his equations for these substances are, in the main, correct; but their object and connection with the erroneous and fundamental theory of development, which he has propounded, are not very apparent."

Without commenting upon the somewhat unusual phrase "equations for *substances*," I may remark, that we are not informed whether the word "their," in the above sentence, refers to the "substances" or to the "equations."

3. The main objection which is raised to my paper seems to be, that the silver, having given up all the oxygen with which it was combined, cannot "seize" more oxygen from another substance. A reaction of the same nature is so well known to chemists, that I need hardly occupy space by giving it in full. In the manufacture of sulphuric acid

$$NO_4 + 2SO_2 + 2HO = NO_2 + 2\,(HO{\cdot}SO_3)$$

where the hyponitric acid (NO_4) gives up two equivalents of oxygen and becomes (NO_2), which, in its turn, will be again oxidized and become (NO_4), and thus the reaction will continue for any length of time.

4. The next statement is: "We know from experience that zinc and iron have very strong affinities for oxygen, but they have no power to remove oxygen from acetic acid," &c.

In speaking of the action of silver on acetic acid, I was careful to mention the fact of its being in the "*nascent*" state, which would entirely alter the case represented in the above paragraph. We have no proof that iron or zinc in the nascent state would not absorb oxygen from acetic acid.

5. Again it remarks: "It is well known, moreover, that silver salts containing oxygen produce the precisely opposite effects with aldehydic acid to that attributed to them by Mr. Cherrill."

I attributed *no effect* to any silver salt containing oxygen.

6. We are next told: "They yield oxygen to the acid, so that the aldehydate of silver is extremely unstable, from its tendency to form acetic acid and silver;" which, speaking of the action of oxide of silver, is exactly what I said.

7. With regard to the remark—"When the fundamental theory is wrong, the superstructure based on it must fall to the ground"—I need only suggest that, under the present circumstances, there is the possibility of its having some application to the other side of the question.

8. That the compound of glycocine added to the developer does cause the latter to oxidise is proved by the simple fact that in the presence of free acid a sesquisalt will be formed with great rapidity.

9. It is urged, against the above assertion, that glycocine "can itself be oxidised by mercurous nitrate." I showed in my paper how glycocine could be oxidised by hyponitrous acid.

$$C_4\,NH_5\,O_4 + NO_3 = HO + N_2 + C_4\,H_4\,O_6$$

and I see no reason to suppose but that "mercurous nitrate"—whatever that may mean—might have a similar action; but I am at a loss to understand how, by showing that any substance may be oxidised, it is proved to be incapable of deoxidation.

10. There is no misprint in the words "acetic acid is sufficient to form with oxygen a persalt of iron;" and when taken in the place in which they occur, their sense is such as not to require either comment or observation.

In conclusion, I may give the following equations, which will be found to embody the argument I used, and which, if found to be untrue, must be proved to be so, not by dogmatical assertion, but by fair chemical reasoning:—

Nitrate of Silver — Sulphate Iron — Acetic Acid (Hydrate)

$$3\,Ag\,O,\,NO_5 + 6\,Fe\,O,\,SO_3 + 3\,Ac,\,O_3\,HO$$

Sesquisalts of Iron — Aldehydate Silver

$$= 2\,Fe_2\,O_3\,3\,SO_3 + Fe_2\,O_3\,3\,NO_5 + 3\,Ag\,O\,Ac\,O_2 + 3\,HO$$

and

Acetic Acid

$$Ag\,O\,Ac\,O_2 + HO = Ag + A\underset{\cdot}{c}\,O_3\,HO$$

or,

Formic Acid

$$2\,Ag\,O + C_2\,H_2\,O_4 = 2\,AG + 2\,HO + 2\,CO_2$$

or,

Acetic Aldehyde

$$2\,Ag\,O + C_4\,H_4\,O_2 = Ag + HO + Ag\,O\,C_4\,H_3\,O_3$$

Yours faithfully, **Nelson K. Cherrill.**

ORGANIC DEVELOPMENT.—SUGGESTIONS AS TO THE CAUSE OF FAILURE.

Sir,—The great interest still taken by photographers in the discussion of the new organic developers must be my apology for entering on the subject again, coupled as it is with a belief that I can throw more light on the worst discrepancy in the results obtained by various operators. First, please pardon me if I take exception to the manner in which our able and talented coadjutor, in the "Echoes of the Month," would dispose summarily of the matter. Sir, when three prominent members of the Photographic Society of London come forward on the same evening to give us their experience on this matter, and a very large gathering assembles to hear what they have to say; when, further, the pages of the Photographic News are teeming with communications on the matter; and further still, photographers everywhere are thirsting for information on this point—then, I say, is an extraordinary time to choose to quietly shelve the thing, and talk about having no more to say about it.

Again, it is absurd to say it may do very well for those whose chemicals, &c., are always out of order, &c. These latter are not the people who have produced such charming pictures by gelatine development. Let your correspondent recall the names and works of those who have advocated it, and judge who they belong to, the higher or lower class of photographers.

But enough: this principle cannot fail to take its place as one of the most vital improvements ever made in the collodion process, and each succeeding week proves it more conclusively. Last week you had a letter from Col. Stuart Wortley, giving his adhesion, and sending lovely pictures. The chief reason why so many have failed is for the very cause given by that gentleman—they use *too much* of the new preparation.

I have now for some time past been engaged in careful experiments on the subject, and my final conclusion is, that the very finest gelatine developer contains two grains only to a pint of ordinary developer. With this is obtained always that happy union of sufficient intensity and full delicacy so much desired.

A great error has been made in supposing these negatives are *denser* than others; the truth is, they are *much thinner*, their non-actinic colour giving them printing value. If a gelatine negative were made as dense to look at as ordinary negatives, it would be harsh and chalky. Again, it is entirely erroneous to say the time of exposure is longer. If a longer time be required, there is too much gelatine. Again, if it gelatinizes or refuses to pass through a filter paper, there is too much. I use it daily for developing portraits, reproductions, and enlargements, and never use more than one quantity without silver added.

The notion expressed by Mr. Debenham, and one or two others, at the last meeting of the Society, that a negative that acquires its density at one operation is inferior, is quite heterodox—incorrect *in toto*. It is the test of perfect balance in chemicals, light, apparatus, and manipulation, to have the negative, with *one quantity* of developer *without silver*, acquire its finished value. If this be not the case there is something requiring rectification in one of the four departments.—I am, sir, yours truly, Samuel Fry.

PRINTING ON OPAL GLASS.

Sir,—The process you introduced some time ago for printing with collodio-chloride of silver I have worked with great success, both on paper and opal glass. The latter I think is more useful than for paper, although prints may be produced on paper as fine as anything on albumenized paper with a silver bath; but for opal glass I think there is no process in photography capable of producing such fine results as collodio-chloride of silver on opal glass, that is, if the instructions you give for using it be strictly followed. I think failure impossible.

If a suitable printing frame be used, there is very little trouble in the whole process. I have seen many frames for this purpose, and, in my opinion, there has been something wanting in all of them, as most of the frames I have seen are only usable for one size negative and one size opal glass. I have for some time been constructing a frame to meet all the requirements (that is, a frame so constructed that any size negative or any size opal glass may be used in the same frame from 2½ by 2 inches to 12 by 10 inches or larger, so that a small negative may be used to print on a larger opal glass of any size between the smallest and the largest); for instance, say a head of a whole-plate negative is required to be printed on a 4¼ by 3¼ opal glass, it can be placed in any position in this frame, or, as it sometimes occurs, that an opal picture is wanted of a negative that contains four positions, such as many photographers take their carte de visite pictures. I never use glasses less then 8½ by 6½ for cartes, and put four negatives on it in different positions; sometimes I use a glass 12 by 10, and put eight negatives on it. One of this kind I once sent you to look at. In this case, if I want to print one of the four or eight on an opal glass 4¼ by 3¼, I do not require to cut the negative, but can place it in my frame in any position, and can, on the other half of the frame, place the opal glass to suit the negative, and it matters not what thickness either the negative or opal glass may be, it can be adjusted to suit all thicknesses of glass, and get an equal pressure. This is done by means of springs and screws, as when the negative and sensitive plate are placed in their position they can be fixed firmly, so that when the frame is opened to see the progress of the printing, there is no fear of moving it, and it always goes back to its place. The following is a description of my frame; if you think it will be of any interest to the readers of the News, you are at liberty to do as you please with it. I enclose you photographs of the frame—as it will be better understood—together with an explanation, as far as I am able to explain it. I may say it is not my intention to make these frames for the profession; but as I have found many things in the News from time to time that have been very useful to me, I think it is only right, if I have anything that is likely to be of use to others, to place it before the readers of the paper. I have derived much benefit from it myself.

Description of Frame.—The printing frame consists of two frames made of wood, very true, 17 by 16 inches, and 1¼ inches thick; each of these is hinged, and the hinges must be of the best and truest kind possible. Working in each of the two frames are two sliding bars, one pair to contain the negative, and the other the opal glass; the bars for the negative, as they have no springs. Those on the other half of the frame have a loose piece or strips of wood; under these small strips are springs made of steel; this allows the opal glass to give way when the frame is closed, and the negative brought close to it, and causes the opal to find its own level against the negative. While it is still closed, the screws which clamp the sliding bars are screwed up tight against them. These bars slide in a groove, and being tightened up, keep the negative and opal glass in their places. At the ends of the bars are strong elastic bands; these clasp the bars together, so that movement is impossible either way. To secure the frame going back to its place when opened to examine the progress of the printing, there are two hard wood pegs and two holes for them to fit in; there are two hooks which fasten in two eyes on the other half, which keep the frame close when shut. To regulate the thickness of the glasses there are four screws, with a fine thread, which pass through the small strips of wood in the bars, and a milled head nut, so that they can be worked up or down to suit any thickness of glass.—I am, Sir, yours respectfully,

George Willis.

14, *Londesboro' Terrace, Scarborough, Dec.* 18*th*, 1865.

[Mr. Willis's communication was accompanied by eight photographs of the frame, to show its working, which appears to be very perfect and ingenious. It is somewhat difficult to make the details of such a frame perfectly clear without the aid of diagrams, which, as our readers generally will not make their own frames, are scarcely important to give. The best plan would be for Mr. Willis to induce some manufacturer to make these frames for the public, as we believe that photography on opal glass is growing in public estimation. In the meantime we may mention that the frame designed by Mr. Robinson, and manufactured by Mr. Meagher, which we mentioned some time ago, has proved completely successful, and we hear the highest opinions of it by the most competent judges.]

COMPOSITION NEGATIVES.

Sir,—Herewith you have a few samples, showing the progress that I have made in composition negatives; that is to say, two or more subjects photographed upon the same preparation. By using a black velvet background, any number of figures may be introduced at separate times, giving perspective at pleasure. Figures with light dresses placed in the foreground will admit of darker figures being placed behind absolutely perfect, always leaving a dark ground where the next group is intended to be. Groups may be introduced into landscapes. Contrive the front of camera so as to admit of using two lenses—say a portrait lens for figures—and make it so that the lens can be moved to any part of the plate. Lightly dressed figures can be introduced quite perfectly, selecting a dark part of the picture to come behind them. If you think this idea is worth printing, do so; but I fear it will not turn out to be any particular advantage, though I like it myself; however, I leave the matter in your hands.

You see the specimens sent are done with bad light, and must not be looked at as specimens of photographs, but only to show the plan. This is my plan to place a border round the portrait. Place inside the camera, as near the plate as possible, a piece of cardboard with an oval cut in it. Take the portrait through this oval, then remove the cardboard, and then expose the border with the oval centre cut out, and a piece of black velvet or dead black paper placed behind the oval. Allow the portrait already taken to fall within this black part. It may be exposed a very long time without injuring the impression. If I am not plain enough, I will write again, should you think it worth notice.—I am, sir, yours very truly, J. Eastham.

St. Ann's Square, Manchester, January 31*st*, 1866.

[The examples enclosed, with floral and lace designs, illustrate the possibility of producing a number of pleasing effects by the application of the method which Mr. Eastham points out.—Ed.]

Photographic Notes and Queries.

Queries on Lenses.

Sir,—I have occasionally used my No. 1 triple lens for portraiture, and have succeeded, in a strong light, very well. I have been each time much pleased with the pictures obtained; there have been a roundness and depth of focus—in fact, a general perfectness of definition, without painful sharpness anywhere—which have added much to the pictorial effect. In a dull light, however, this lens is useless for portraiture, on account of the long exposure necessary. I have often wondered why we could not have triples made to work as rapidly as portrait lenses, but have taken it for granted that the opticians knew best. I see that a writer in one of your contemporaries, last week, states that an accident has enabled him to discover that rapid-working triples are quite possible. I wish to ask, sir, if you can give any further information on the subject, and also to ask if it does not seem rather discreditable to our great opticians that the possibility of supplying an obvious want should be left to the result of an accident? I should like, also, to know, if it can be simply explained to one who is quite ignorant of optics, why it is that all the new lenses, made to include a wide angle and give straight lines, seem to require so small a stop in order to give respectable definition? This is, at least, the case with all I have seen or read of—doublets, globes, and periscopes. I have understood that the simplest form of non-achromatic single lens would do much that is claimed for the various new lenses, if a pinhole stop were used. If so, do we gain much by the complication and cost of the new lenses?—Very truly yours,

J. C. C.

[Regarding your first query, the modified triple, about which you enquire, was not left to conjecture or accident, but has been in existence as a practical fact for months. Mr. Dallmeyer has made several such, which have been tried and highly approved by some of our leading photographers. Two months ago Mr. Cooper showed a very artistic picture at a meeting of the South London Society, produced by one of these lenses, in which the distribution of focus was admirable. We remember Mr. Sebastian Davis remarking upon it, that the production of such a lens did more for art-photography than a score of scolding papers on the subject. The reason why it has not yet been much introduced to the public is, we understand, because Mr. Dallmeyer believes that he can still improve upon it, and he does not wish to announce it until it is in its most perfect state. In regard to your other queries, they cannot be answered satisfactorily in a few words to one who is ignorant of optics. But you must remember that the science of lens making consists very much in effecting compromises, in which the aim is to gain as much and sacrifice as little as possible. The object to be gained in a photographic lens is to unite, in an approximate focus, a number of rays on one plane, which have been reflected from various planes at various distances, and also to unite on one plane the rays which, from their different degrees of refrangibility, would come to a focus on different planes. This can only be secured by effecting a series of compromises or compensations; and where the aid of refraction can go no farther, the use of the small stop comes in. But we hold the necessity for a very small stop to be a fatal defect in a lens, and where it is imperative, we hold the advantages secured as not compensating for the inevitable defects.—Ed.]

The New Organico-Iron Developer.

Sir,—I have thought that all the vast amount of talk and letter-writing there has been over the new developer has been to very little purpose. From the fact that the one thing needful—increased sensitiveness—is not secured, while the other qualities are easily obtained by any careful worker, I think I may say, without risk of erring, that it is almost impossible for anyone with *clean* glasses, a decent bath, and any good collodion, accompanied with a wee bit of brains, to have stains and all the imperfections that the gelatine-iron combination is said to sweep away. With the ordinary developer I notice that the principal claim for it is intensity at one operation. That, of course, is a matter that we all happen to regard in a different light; for one prefers soft pictures, while his next door neighbour likes brilliant effects. Now I hold that a good photograph cannot be made by scamping the work, and that it is in the operation of intensifying that a negative can either be a triumph or a disgrace. X.

Talk in the Studio.

Photographs in Natural Colours.—In some recent experiments with photography in natural colours, in which we have used collodio-chloride of silver as the original basis of operations, we have met with some curious and successful results. Details in our next.

Competitive Exhibition in Edinburgh.—We invite the attention of our readers to the particulars of a Competitive Exhibition, announced by the Photographic Society of Scotland, to be opened in March. Five medals will be awarded: one for the best view by a dry process; one for the best view by an amateur, by any process; one for the best portrait; one for the best enlargement of a portrait; and one for the best enlargement of a landscape or architectural subject. The Council will award extra medals for special merits, if they see occasion. Further details appear in our advertising columns.

Paris Exhibition of 1867.—We call the attention of our readers, intending to send specimens to this exhibition, to the fact that all applications for space should be made before the 28th of the month. Full particulars and forms can be obtained of the Lords of the Committee of Council on Education, Science and Art Department, South Kensington Museum; or of Mr. Peter Le Neve Forster, at the Society of Arts, John Street, Adelphi.

The Royal Academy.—The Presidentship of the Royal Academy, rendered vacant by the death of the late Sir C. Eastlake, is now again filled by the election of Mr. F. Grant, who is chiefly distinguished in connection with portraiture. Sir Edwin Landseer was first elected to the vacant chair, but after a week's deliberation—which, after his first refusal, he was requested to give the subject—he again declined the honour, and Mr. Grant was elected. Mr. Maclise also refused to be put in nomination. The late President was one of the earliest appreciators and warm admirers of photography.

Curious Action of the Yellow Ray.—It will be within the memory of old photographers that, in the early days of the Daguerreotype process, M. Claudet made some singular and interesting experiments with the yellow ray, in which he found that it destroyed the impressions made by white light on a Daguerreotype plate. This gentleman, whilst recently seeking a method of readily producing a print from a negative, exposed a sensitive Daguerreotype plate under a negative for a few seconds and developed it. This produced, however, as he expected, a negative image. He now proceeded to reverse the operation. He exposed a sensitive Daguerreotype plate to light, and next exposed it under a negative and a yellow glass; he then developed, and obtained a perfect print of the negative. The *rationale* is very simple: the plate exposed to light would, if developed with mercury, become white all over, but the yellow ray, passing through the transparent parts of the negative, destroys the effect of light in these places, leaving the shadows black when developed, and so producing a print with a due relation of light and shade.

Paris Great Exhibition.—Professor Joy stated, at a late meeting of the New York Polytechnic Association, that, on his recent visit to Paris, it seemed to him as if the whole city was being pulled down in making preparations for the great exhibition. One company has purchased a tract of two miles in length right in the heart of the city, and is pulling down all the buildings to make room for others better adapted for one of the collateral speculations connected with the exhibition. The *Scientific American* says that if the idea be carried out of illustrating, practically, the industry of all nations, at present contemplated, there will be seen in the middle of Paris Laplanders making fishing tackle; Ural Tartars employed in the preparation of skins and carpets; the Kabyles of Algeria making the glazed pottery of Bjerdjera, carvings in the wood of the fig tree, ornaments in silver and coral, and carpets of Oran and other districts; natives of Morocco weaving silk, cotton and woollen fabrics, making fez caps, saddles, and arms, and preparing shagreen; negroes of Soudan producing cotton cloth, morocco work, and pottery; the half *petit blancs*, of the Isle of Bourbon, making sacks for sugar and coffee; Anatolians weaving Smyrna carpets, silks and cloth of gold; Syrians fabricating tissues and arms of Damascus and Aleppo, mother of pearl work of Bethlehem, and gold work of Beyrout; Persians at work on Kurdistan carpets, silk embroidery, Kirman shawls, silks and cottons of Yerd, enamelled tiles, and damascened arms; Indians weaving muslins, embroidering cashmeres, engraving ivory and wood, and twisting threads of gold into bracelets and other ornaments; Cambogians fabricating boxes and toys from sandalwood; Siamese carving rhinoceros horn; and, perhaps, Chinamen carving a nest of ivory balls; Japanese painting their incomparable lacquor wares; Mexicans turning their perfumed pottery; and redskins composing head-dresses of feathers, and bead-embroidered moccassins."

Blistering of Albumenized Paper.—A correspondent states that he has met with blistering for the first time on using warm toning solutions. All the same materials used cold gave results quite free from blisters.

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To Correspondents.

R. D.—A copyright picture cannot legally be copied at all, neither for sale nor for private and gratuitous circulation. Registration does not, however, secure a copyright in the portraits you take for customers, without the written agreement of such customers. Your only remedy against the mean practices to which you refer consists in making a high charge for a single first copy.

F. W.—Several articles appeared in our last volume on the production of "doubles." You will find full particulars in our recently published Year-Book for 1866. The details are too lengthy for repetition in this column.

Robert B. Thorpe.—We cannot tell you with certainty; but it is probable that Mr. How, of 2, Foster Lane, could help you.

M. W.—You can have some of the back numbers for the last two or three years, but not all, as some are out of print. If you state what numbers you require, we can give you an exact answer. 2. To the Lords of the Committee of Council on Education, South Kensington Museum.

P. W. J.—The lighting and general qualities of the negatives in Nos. 1, 2, 3, and 4 are good; in 5, 6, and 7 the light is too much from the front. There is a little stiffness and want of pictorial arrangement in all, into detail of which, however, it would be difficult to enter here. On the whole, especially considering the circumstances you mention, the work is good.

J. M. M.—We have not made any material modification in our collodio-chloride process for printing on paper since we wrote on this subject, a few months ago, in the News. A collodion with good body, giving a film neither very horny nor very powdery, containing about 2 grains of chloride of strontium, 7 or 8 grains of nitrate of silver, and ½ grain of citric acid in each ounce, will give good results. If the collodion be too horny and the film get perfectly dessicated, it is sometimes difficult to get good toning, the gold having difficulty, apparently, in penetrating the hard, dry, horny film. For paper prints an active bath is necessary, a lime bath or an acetate bath, in good active working order, answering well. For opal glass, the toning bath should be weak and old; but for paper such a bath does not answer well. In some cases, a bath of hyposulphite and gold, not old or acid, tones best; and such prints, produced twelve months ago, and washed only a few minutes, are still in good condition. We know of no objection of any kind to its use on paper.

Sir Joscelyn Coghill.—Thanks. The letter was handed to its destination, and its sentiments were warmly reciprocated.

T. A.—We shall be glad to receive a brief paper on the subject.

L. Bristolws.—The silver coin of the realm contains an alloy of copper, and it is to its presence the blue colour of your crystals is due. The presence of nitrate of copper, in small proportion, is not generally injurious in photographic operations; it may, however, be removed by heating the crystals of nitrate of silver to fusion, which will decompose the copper salt.

Ajax.—It is better to throw down the silver from a bath which refuses to work after applying the best remedies you know. 2. The term quinque gems was given to an arrangement of five small oval portraits on one card. 3. We do not understand what you mean by the formation of mildew on a plate, never having met with anything of the kind. 4. The method of making a film of gelatino-chloride of silver insoluble consists in immersing the picture in a strong solution of alum before toning and fixing. The bad weather and pressure of engagements have prevented a careful repetition of the experiments necessary to reducing them to formulæ for publication.

S. H.—Mr. Carey Lea's solution for cleaning glasses is one of the best; it consists of one ounce of sulphuric acid and one ounce of bichromate of potash in an ounce of water.

Lectures at the Royal Institution.—A correspondent, who adds no signature, asks if these lectures are reported in any journal. We believe not regularly. Occasional series have been reported in the *Chemical News*; but not regularly. Abstracts of such lectures, unless very copious and illustrated with diagrams, would not be interesting. As a rule, moreover, the lecturers prefer to reserve their own copyright in such lectures.

Old Pupil.—The fog which is on the surface, and may be removed by friction, generally arises from the presence of organic matter in the silver bath, which causes it to be very readily reduced when in contact with the developer. Sunning and rectifying the bath will generally remove it. Sometimes the addition of a little more acid to the developer will effect a cure. The fog which seems more in the body of the film may arise from various causes; the condition of the bath or collodion, or especially the presence of diffused light. 2. It is very bad economy to use second-hand glass. It is a frequent cause of fogging, which is very difficult to deal with. Mr. Carey Lea's solution, the formula for which is given above in the answer to "S. H.," will clean them best. 3. The formula with red oxide of lead was for a flux to add to enamel colours. 4. Carbolic acid contains $C_{12}\ H_5\ HO$.

Copyright.—If you induce a person to sit for you for any consideration, the copyright belongs to you. 2. The full name and residence of each member of a firm should be registered. 3. It is not necessary to have any intimation on a picture that it is copyright. It is the duty of every one to assume that a picture is copyright until proved otherwise; not to assume that it is not copyright until it is proved to be so. 4. You cannot acquire a copyright on the copy of an uncopyright picture.

Photo Juvenis.—We have not worked with collodio-chloride by gas-light. It is probable that by using the developing process with it, described by Mr. Swan, good results might be obtained The ordinary hypo bath should be used after development. The best mode of proceeding in such a case can only be ascertained by experiment; but we should try pyro development.

T. E. H.—To copy a map 20 feet by 12 feet, the full size, it must be done piece-meal. The camera must be most carefully adjusted, so as to be parallel with the original, and should not be moved at all during the operation; but the original map should be moved to bring the successive portions opposite the lens. A triple lens will answer best. The copying table described in our last volume by Mr. Dunmore will answer the purpose well.

Engineer.—The formula for collodion we give in our Year-Book is one we have used with success. About equal portions of iodide of ammonium and cadmium, from 4 to 5 grains of the mixed iodides to the ounce, with about 1 grain of bromide of cadmium, answers well and keeps well. We shall have pleasure in receiving the communication you mention, on your travelling experiences. We are glad you liked the presentation plate.

J. Herbert.—A transferred collodion film is, we believe, generally used for applying to the thick paper weights you mention; but we see no reason why an albumenized print should not be used, cementing it with Canada balsam or varnish. We have never attempted the operation ourselves.

H. S. W.—A good half-plate lens will serve for all smaller sizes, provided you have length of room enough to permit you to use the camera at a sufficient distance from the sitter. The distance will probably be about twenty feet, with such a lens, for cards; but as half-plate lenses are not all quite the same focus, we cannot state absolutely.

X.—No specimens were enclosed in your letter.

R. R. Taylor.—Your suggestion is ingenious; but the imperfections of material and apparatus would become so enormously manifest, long before any results were obtained, as to preclude any possibility of useful application; the structure of the material alone would become so coarse when magnified as to nullify the experiment. An amplification of fifty diameters is the utmost that can be used with any advantage, an amount of enlargement which would be as nothing in the experiment you propose. The formula for organic developer you mention ought to answer; but the results you describe indicate that less gelatine and longer exposure would be an advantage.

Justitia calls our attention to the fact that a contemporary persists in ignoring Mr. Leahy's claims to the origin of alkaline development, because he only used alkalies, and did not add pyrogallic acid! Of course such reasoning answers itself. We have already pointed out that development by the vapours of ammonia was first effected and noticed by Mr. Borda in America, and development by a solution of ammonia and by other alkalies by Mr. Leahy; and his discovery was the first definite recognition of the important fact of alkaline development. We do not insert our correspondent's caustic letter, because the subject does not require further discussion. We append the opinion of an impartial looker-on as to the mode of dealing with the subject by the writer in question. The Editor of the *American Journal of Photography* says:—"To the *British Journal*, on questions of history or of honour to whom honour is due, the truth is a greater stranger than fiction. The persistence with which it has falsified the history of the fuming process, the alkaline development process, &c., has to us a phase which is decidedly ludicrous. We read the opinions of the editors of that Journal on the history and relative merits of processes with the same kind of curiosity and gratification that we read the editorials of the *New York Herald*. When read, however, we generally throw such rubbish into the waste box."

L. J. Kieffel (Goldberg, Mechlenberg).—Thanks for your complimentary letter. Opal glass suitable for photographs is manufactured in this country by Chance, of Birmingham. We have generally obtained it of Messrs. Claudet and Houghton, High Holborn, London. We should think it might easily be obtained through some German House having business with London houses. Did you receive our letter sent sometime ago by post? Thanks for the excellent collodio-chloride print enclosed.

J. B.—In using the ammonia-sulphate of iron for a developer, it may be treated as ordinary sulphate, but as a rule the solutions may with advantage be made one-third stronger. A 30-grain solution with 20 minims of acetic acid will work well. 2. You will find several articles describing the production of transparencies in the volumes you possess. In Vol. 6, on pages 175 and 410, both of which are thoroughly practical articles, producing excellent results, which we have seen; in Vol. 8 you will find articles on pages 113, 404, and 620; and in Vol. 9 on page 404. Most of these articles describe the method with dry plates. Our Year-Book for 1864 contains an excellent article on the production of transparencies by wet collodion.

F. Loder.—Lithographic chalk is a kind of crayon containing greasy matter, used for drawing on a grained lithographic stone. If this be ground up with the other ingredients named, it would doubtless form a transfer ink, but whether the best for the purpose or not we cannot tell. The fullest information on this process is to be found in Mr. Osborne's articles, and some articles by Mr. Lewis in our pages.

P. F. P.—The best manufacturers of photographic papers reside in France and Germany, and you would not be able to procure from them the small quantity you require. Any of the dealers in photographic papers whose announcements appear in our advertising columns, will doubtless be able to supply you with plain paper for albumenizing.

Castleberg.—The best method of preventing cockling of the mounting board is to make it damp before mounting the print, so that, in drying, all parts shall contract equally; cockling being caused by the portion which becomes moist from contact with the adhesive material, contracting more than the margin, which has not been damped. It is perhaps difficult to do this in mounting prints in a book; but if it cannot be done, the next best plan is to mount with glue containing as little water as possible. The less water an adhesive material contains the less tendency to cockling is produced.

The Publisher begs to announce that applications for odd numbers of the Photographic News should always be accompanied by a remittance in stamps. Applications for odd numbers without such remittance cannot receive attention.

THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHS IN NATURAL COLOURS.—SUCCESSFUL EXPERIMENT.

We have a very simple and curious experiment to describe in the photographic reproduction of natural colours; but as we have succeeded in the production of these colours only once, we mention the circumstance rather as suggesting a path for experiment than as establishing at present any theory or process.

We should premise that in almost every instance in which the actual production of various colours has been secured, the sensitive surface employed has been the violet sub-chloride of silver, a substance of which but little is known. In the experiments of MM. Becquerel and Niepce, it was obtained by complicated and troublesome means on a plate of silver. In M. Poitevin's recent experiment it is applied to a sheet of paper, but the details of its preparation are not published. As the action of light on white chloride of silver is to liberate chlorine, it appears probable that at a certain stage, whatever may be the final result, about which some dispute exists, one equivalent of chlorine is removed, and sub-chloride of silver is formed. It occurred to us, therefore, that in the experiments for the production of photographs in natural colours, our collodio-chloride of silver presented an agent for experiment more convenient than any other we knew. In order to test it we tried one or two hasty experiments, which we shall describe.

We first coated a plate of opal glass with an old sample of collodio-chloride of silver, containing citric acid, and then thoroughly washed it to remove free nitrate of silver and free acid. This plate, after drying and exposing to prolonged sunshine, scarcely darkened at all, not passing in a couple of days beyond a pale lavender; and when further exposed under coloured glass, became a trace darker in the unprotected portions. Beyond this no change was observed.

We also coated a plate of opal glass with a sample of collodio-chloride which had been made more than twelve months, and having accidentally been placed in the light for a time, had become altogether of a deep lavender tint. The plate, coated with this, and exposed under coloured glass, exhibited no results worthy of remark. The film showed, however, that by long contact with free nitrate of silver the pyroxyline had undergone decomposition.

The third experiment, however, gave us very striking results. In this instance we prepared a fresh sample of collodio-chloride of silver, to one ounce of which about two grains of chloride of strontium and five grains of nitrate of silver were added; the object being to form a collodio-chloride with the slightest possible excess of nitrate of silver. A plate of opal glass was coated with this, dried before a fire, and exposed to diffused daylight until it assumed a deep lavender grey tint or slate colour. Several pieces of coloured glass were then placed on the coloured surface, and the whole placed in sunlight for several hours. The coloured glasses consisted of a piece of deep ruby glass, a piece of bright orange red, and, in the absence of other colours—the experiment having been undertaken without premeditation or preparation—a piece of white patent plate, on one end of which was poured a concentrated solution of aniline red, and on the other end a concentrated solution of aniline green, a space of clear glass remaining between the two. Various spaces of the film of violet or grey subchloride remained uncovered, and, without any other glass over the pieces of coloured glass, the whole was placed in strong sunlight, as we have said, and left in the open air. The exact time of exposure to sunlight we cannot state, as, having exposed them about mid-day, we were subsequently called away, and found them at midnight, when we returned, on our study table, having been taken in at dusk by one of our household. On removing the coloured glasses and examining the film by gaslight, we were surprised and delighted to find vivid indications of each colour in its true relation. Carefully placing it away in the dark, we examined it carefully by daylight next morning. Under the ruby glass the tint was of a bright claret or magenta colour; under the orange, of an orange tint, more inclining to red than the glass itself; under the white glass covered with aniline red, the tint was of an orange, but graduated into a deep purple red where the colour had, in drying, run into a pool or ridge; under the glass coated with green aniline colour a deep green, deepest where this colour had run into a pool or ridge.

But the most singular part of the case is to relate. All the portions of the film which were not covered, and which were therefore submitted to the uninterrupted action of the light, had gone on darkening in the usual way, passing from the cold grey or slate colour into a bronzed black; but the portion covered by the bare white glass, free from aniline colour, was bleached to a yellowish white; and on examining the glass carefully, we found the glass slightly tinged with yellow, as is not uncommon in the samples known as white patent plate. Here was a film of chloride of silver, which, having been submitted to the action of light until it was of deep warm grey colour, was bleached to a yellowish white by the continued action of light through a piece of yellowish white glass, whilst the portions of the same film submitted to the same light uncovered, passed on to a deep bronze black. Those portions submitted to the action of light which we should have pronounced quite non-actinic, the ruby glass perfectly cutting off, when examined in the spectroscope, all the rays above the line D, passing from the grey tint to varieties of red, and portions covered with green assuming that colour, the deepest tint being produced by the deepest colour.

In this instance none of the additional substances used by M. Poitevin—such as bichromate of potash, sulphate of copper, or chloride of potassium—were employed. How far the experiment can be repeated, and whether other colours could also be produced, we cannot undertake to say, for uncertainty appears to have been hitherto the invariable accompaniment of this class of experiments. Our chief object in recording the result of limited experiments is to point out to others, engaged in similar research, the great advantages presented by the use of collodio-chloride of silver as a simple means of securing a layer of the violet sub-chloride,* which now appears to be recognised as the common starting point.

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UNNECESSARY LIGHT IN THE STUDIO.

In our last, a communication from "R. A." very pertinently illustrated the detrimental effect on the brilliancy of the picture produced by unnecessary light in the studio. This is a subject upon which we have often written; and the idea illustrated cannot be too often enforced. The reflections from a variety of objects, and the light from a mass of illuminated atmosphere reaching the lens, instead of the light only from the objects forming the picture, must necessarily tend materially to destroy brilliancy.

Any one gazing into a stream of water will find that he has to look for some time very carefully before he can distinguish objects in the water; but let him place his eye at the end of a tube, the other end of which is just in contact with the water, shutting out all surrounding light, and he will be able to see objects in the water almost as perfectly as in the atmosphere. Again, it said that a person at the bottom of a deep well can, on looking upwards, see stars in the day time. What is true of the human eye is true in the lens: reflections from many objects, or from an illuminated atmosphere, mingling with the rays from the object to be defined, destroy the brilliancy of its image.

There are many ways in which the lens can be protected from false lights. Our correspondent last week indicated some. A year or two ago we suggested a system of screens having the same object. Many persons, including Mr. Claudet and other distinguished photographers, enclose the camera in a travelling dark room. Others use a cone in front of the lens, projecting about a foot. Mr. Robinson, in the admirable article on the "Glass Room," which appears in another page, provides for the light chiefly reaching the sitter, but he also employs such a cone as we have described. Some photographers darken permanently one end of the dark room, and some even resort to the use of an unsightly tunnel.

We recently paid a visit to the studio of M. Silvy, now in course of rebuilding, and of which, when complete, we shall probably give a description. In the meantime we may observe, that it possesses ample facility for removing all unnecessary light, without in any way interfering with comfort and elegance. Each end of a capacious studio, of about forty feet long by twenty feet wide, is well protected from unnecessary light. The lighted central compartment has two lofty side lights thirteen feet high, joining a roof light on each side of two or three feet more. The side light extends about ten feet on each side, whilst on the west side it extends about ten feet additional in advance of the sitter; these additional windows not being, however, quite so high as the main side light. There is also a small portion of high front light, which can be used if occasion require. But the chief feature of the studio is the facilities provided for shutting off effectually all light not absolutely required for illuminating the sitter. This is the point we insist on. In the ordinary oblong room with the ridge roof, the simplest form of studio, this may be secured as well as in any other arrangement, and will permit the end to be obtained without any sacrifice of comfort and elegance.

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MR. WALLIS'S LECTURE ON ELEMENTARY ART.

On the evening of Thursday, February 8th, Mr. Wallis, Chief of the Art Department at South Kensington Museum, delivered an address on Elementary Art, as relating to Photographers, to the members of the South London Photographic Society, illustrating his remarks by photographs and drawings on the black board.

He commenced by asking, what was a picture? and then proceeded to define it as a representation, on one plane surface, of real objects occupying many planes. The three great essentials of such a representation were form, light and shade, and colour. It was chiefly with light and shade photographers were concerned: to questions relating thereto, and to composition, he would chiefly direct attention.

Taking up a photographic landscape, he pointed out that everything was well defined and in perfect detail, yet it lacked one very essential point of a picture. It lacked one focus of interest, such as Turner would have given it, all the rest being imperfectly made out, or in a state of semi-dissolution. "This," said Mr. Wallis, taking up Mr. Robinson's "Early Spring," "is much more like what Turner would have done, although it lacks something the painter could have given to it." An instantaneous photograph by Mr. Leake was next pointed out as very perfect in many respects, but having the distance too pronounced, and a black boat cutting sheer against the water. Taking up a portrait of Mr. Hannaford, well known to the South London members, he remarked that it was, in many respects, an admirable picture, but, from the absence of light on the hair, the effect of wearing a black wig was communicated to the figure. A photograph of the Falls of the Clyde, by Annan, was almost perfect, he pointed out, but for the presence of two distinct lights of equal intensity, a circumstance which, he thought, might, by choice of time and point of observation, have been avoided. In pointing out photographs which, by some modification, might have been improved pictorially, he wished not to be understood as passing judgment on the photographer who might not have had the opportunity of making the modification. He knew that the exigencies of the art often imposed conditions by which the photographer was trammelled. His sole object was to make use of the photographs as lessons of what was desirable in pictures, whether easily attained or not.

Mr. Wallis then proceeded to illustrate, on the black board, the importance of avoiding formal equal lines; in taking a street view, for instance, the proper position would be to place the camera out of the middle, so as to secure more of one side than the other. He also explained the principles of chiaroscura relating to the massing of lights and shadows, the management of which was the source of success or non-success in photographic pictures. Straight lines, as a rule, were to be avoided, except when used as contrasts to curved lines; and it should always be remembered that the edges of the picture often furnished this contrast. The curved line was the most beautiful line, and should be secured as a rule. The position should have some reference to other circumstances. For instance, Sir Thomas Lawrence would never paint a standing portrait of a tall man. The head and body should not be turned exactly in the same direction; if the head were turned so as to form an angle of 45° the effect would generally be good; in all cases, however, the effect of violent action should be avoided. The disposal of the legs, in male figures, was often troublesome. Some persons had objected to the legs being placed one over the other. This was, he thought, an error; the best painters in the English school of portraiture (and there was no better school) did permit the placing of one leg over the other. The disposal of the hands was another trouble. It should be a primary condition to place them so as to avoid each forming a spot in the picture. As a rule, he preferred to have one hand either altogether concealed or in deep shadow. The other hand he would generally place so as to give a profile view of it. In fact, hands and everything else in the picture should be subservient to the head.

The light and shadow on the head should be the primary consideration. There were three methods of dealing with the head:—One would place the head chiefly in shadow, a plan rarely attempted in photography, but which might be, he thought, at times very effectively adopted, if a suitable background were employed. The second would place the head half in light and half in shadow, a method involving considerable risk, as it was difficult to divide the head into two equal masses of light and shadow, without getting a formal, inartistic effect. Sir Thomas Lawrence frequently used this method, but he managed it with great skill. In painting portraits, he was fond of the large white neckerchief with flowing ends, then commonly worn, by which he could not only lead the eye to the face, but could balance his mass of light on one side of the face. He was in the habit, at the commencement of each day's work, to take up a mass of pure white with his palette knife, and place it near the head, that he might work up to it. This white was cleaned off at night, and again put on in the morning. The third method was that most practised by photographers—it consisted in placing the whole head in a strong light.

Hardness was a fault to be avoided in the photograph, as much as in a painting; and this brought him to the question of taking pictures out of focus, for which, referring to Mr. Cameron's pictures, he thought something might be said. Sir Thomas Lawrence made the eye the only sharply defined part of the face, which gave the eyes the effect of great brilliancy. The same plan has been frequently adopted with great effect by the British School engravers.

On the question of backgrounds he thought photographers had most frequently erred. The simplest and most easily produced were undoubtedly the best, all detail being avoided. Photographers seemed to have aimed in their backgrounds at as much detail as possible grouped into as small a space as possible. He proceeded to produce an illustration of a background, dark at the top and graduated into light at the bottom, as being effective, and especially valuable in giving effect to the head. The kind of background frequently used by Sir John Reynolds, consisting of dark clouds with a dash of light in the horizon, were often effective.

On the subject of lighting he had generally observed that photographers obtained their chief light from the skylight, and it had occurred to him that much might be effected by the use of secondary lights from the side in giving rotundity. With a one-eyed instrument like the camera, every aid to secure rotundity should be employed. The painter, with his two eyes, could, as it were, look round an object, and paint the effect he saw; whereas the camera, being only one-eyed, obtained merely a one-eyed view. A portrait of Mr. Cole, by Mr. Thurston Thompson, which he exhibited to the members, illustrated many of his remarks, and was an example, in many respects, of what a photographic portrait ought to be.

The question of grouping would always demand considerable judgment. Where there were two figures it would be well to have one standing and one sitting; which would secure contrast of form. If both were required to stand, then one might be taken in profile and the other a front view. In a group of three, one standing and two sitting would be best. It had long been a moot point amongst artists as to whether eleven was not the highest legitimate number of persons in a group; he would not enter on the question, however. One thing was certain, there could only be one principal point in a picture, and whether that principal point should consist in a single figure or a group of two or three figures must depend on circumstances. In a group of three, one figure should be the principal; in a group of seven or eight, three of the figures might be arranged so as to form the centre of interest in the group. The difficulty of satisfying each one of a group of sitters with his position, and to meet the pictorial exigencies of the case at the same time, was a difficulty to which the painter was as subject as the photographer.

After some further observations and comments, Mr. Wallis promised, should they wish him, to again address the South London Society on other and more advanced questions on the bearing of art on photography.

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PHOTOGRAPHIC COLLODION WITHOUT BROMINE.

[In the United States, a long pending suit for the enforcement of a patent for the use of bromides in collodion has recently been decided in favour of the patentee, and placed photographers in great consternation. So far as we have examined the question, the patent has not validity of any kind, but patent laws are queer things in all countries, those of the United States being, perhaps, the best. Admitting the validity of the patent, we don't see how it could be maintained. Photographers in the States are, however, on the alert to dispense with bromides, and the following formula is communicated to our excellent contemporary the *Scientific American*.]

For the benefit of photographers, professional and amateur, who do not wish to use bromide in collodion, I am induced to give the following formula, which I have used successfully for some years:—

Take of plain collodion 6 ounces, iodide of cadmium 18 to 30 grains, iodide of ammonium 12 to 20 grains; shake well, and let stand to dissolve and settle.

Then take plain collodion 2 ounces, and chloride of calcium 20 to 20 grains; shake well, and let stand to dissolve and settle.

For use, add a small portion at a time of that containing the chloride to that containing the iodide, until the half tones are such as desired.

Any other soluble chloride may be used, as also other iodides.

I also take, say, a couple of ounces of collodion already excited, and add a very small piece of phosphorus, about half the size of a pea; and of this two ounces, when the phosphorus is thoroughly dissolved, I add about from half to a drachm to the collodion I am using, which has a considerable effect in assisting reduction.

In using this formula the beauty of the result depends:—

First. Upon the materials of the collodion being good, and the collodion itself of the proper thickness.

Second. The iodides being of good quality, and the quantity in exact proportion to the thickness of the collodion, a thick requiring more and a thin less.

Third. A careful proportion of chloride to iodide, which must be determined by actual experiment.

Fourth. An equally careful addition of the collodion containing phosphorus, to that already excited, and being used.

Fifth. A proper regard to the time of exposure, light, developing, etc.

I rarely strengthen with anything except by a 20-grain silver solution, and redevelop with iron. I do not use my developer too strong, and it is very seldom I have to even sulphuret my negatives.

No 481, Canal Street, New York. J. J. Clarke.

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Recent Patent.

PHOTO-SCULPTURE.

BY DAVID GAY.

This invention only received provisional specification. Its object is to produce portrait busts and statuettes by the aid of photography by simpler means than those devised by M. Willeme. It is described in the specification as follows:—

This invention relates to an improved method of treating photographic portraits when intended to be employed for obtaining sculptured models therefrom, and consists, first, in cutting the material on which the portrait is taken or printed, as may be found most desirable, and in using the marginal or outer portions of the material as templates, which I propose to arrange and operate with in the following manner:—For example, upon a circular table or bed plate I arrange or dispose, say, a dozen blocks capable of sliding in radial grooves, by means of screws or otherwise, towards and from the centre of the circular table aforesaid, and in each of said blocks I fix an upright rod with clips affixed thereto for holding the before-mentioned templates; I also mount the aforesaid circular table on an upright pivot, the principal length whereof is formed square, and the extremities round. The upper end of said pivot carries a loose collar with slots about its periphery to receive and hold steady the several templates aforesaid. The material to be sculptured is placed in a plastic state on the aforesaid upright pivot, and said plastic material roughly shaped by hand previous to operating thereon by the several templates, as follows:—Having obtained, by any suitable means, the requisite number of photographic pictures from different points of view of the person or object to be sculptured, I then proceed to cut out the picture; for example, suppose it to be a profile, I carefully cut along the outline of the forehead, nose, mouth, and chin, and use the outer divided portion of the material as a template, which I place in the clips of one of the upright rods aforesaid, and in this manner I proceed with each different photographed position of the person or object to be sculptured, and having fixed all the templates thus obtained in proper position, I commence to operate therewith, as follows:—I take first that template containing the most prominent outlines, and pushing it into contact with the plastic material aforesaid, hold this template steady with one hand, and with the other hand move the plastic material partly round backwards and forwards until the template has scraped the material at this part to the shape of the template, or partly so, and in like manner I proceed successively with all the other templates, until I bring their edges close together in the collar that supports them, after which the sculptured model may be finished by hand; and where several copies are required, I take a mould thereof by any of the well-known means, and pour plastic material therein in the manner commonly practised of moulding objects in plastic materials.

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THE GLASS ROOM AND ITS CONTENTS.

BY H. P. ROBINSON.*

THE kindred subjects of glass houses and light and lighting have been almost worn threadbare; they have been amongst the principal attractions of several Societies during the past year. In April, Mr. Jabez Hughes read an admirable paper, "About light, and about lighting the sitter," at the South London Society, which was followed by a continuation of the question by another member of that Society; and in November Mr. Mayall stated his ideas on the subject to the Photographic Society of London. With all these gentlemen I, in the main, agree, differing only as to the arrangement of details; but there was a paper read before your own Society in March last by Mr. Sutton, on the glass room, containing such erroneous notions, such practically impossible theories, and so much assertion that everybody else was wrong, and that the author alone was right, that I have felt bound, now that the season for glass-room building is commencing, as a photographer who has received many benefits from your Society, and who has had a very large experience in the use and building of photographic glass houses, to come forward and endeavour to point out some of the errors into which the writer of that paper has endeavoured to lead you.

I also take occasion by the way to refer to the evil that is so often done by the dogmatism of theorists. In the present instance, I know of one case of ruin having resulted to a photographer from having endeavoured to erect a glass room according to instructions contained in the paper to which I have referred. The photographer to whom I allude scraped together enough money to build the house and purchase efficient apparatus, about £100; but when he commenced practice, he found his room was so imperfectly lighted that it was only on fine days and with long exposures he could obtain pictures at all, and these very unsatisfactory in quality. With every prospect of success, he had to sell up, because he could obtain no more capital to undo the mischief the paper read before your Society in March last had done him.

In three other instances, during the last year, I have superintended the demolition of tunnel-formed rooms, and have erected rooms in which good photography was possible in their stead. I have heard of other cases where photographers have been put to needless expense in trying the wild theories of this writer, but who have had to abandon them. The only room I know with any approach to this kind of construction in successful operation is Mr. Rejlander's, who has spent more than double its value on it in alterations, and it is now essentially different in principle from that advocated before your Society; moreover, Rejlander could take good and artistic pictures under disadvantages that would puzzle most other men.

Before describing what I consider as most desirable in a glass room, I will point out briefly two or three important errors in the form of that which I so strongly condemn.

It has no vertical light whatever, which every portraitist knows is a light, under certain circumstances, essentially necessary.

It has a large portion of front light, a light which always tends to flatten the picture and produce discomfort to the sitter.

It has a comparatively circumscribed side light, the most important light of all, and of which an extensive range, to be modified at will by blinds, is imperatively necessary.

The whole light admitted is so limited as to admit of no variation to suit different sitters, by shutting out portions at some points, and letting in light at others.

The tunnel has a dreary, dungeon-like aspect, depressing to the sitter as well as to the operator, and it is altogether unnecessary for the ostensible purpose for which it is paraded.

I will now describe the form of glass room which I believe to be most conducive to excellence of result, comfort, and elegance.

The shape should be a rectangle of the following proportions:—30 feet by 15 feet. It should have a ridge roof 14 feet at the ridge, and between 8 and 9 feet at the eaves; each end should be quite opaque. If possible, it should stand east and west, the principal side light facing the north. From 6 to 7 feet from each end, side and roof, should be opaque, the remaining portion of the north side and roof glazed with plain white glass. If the room be required for purposes of portraiture only, both roof and side facing the south may be rendered permanently opaque; but if it be required for occasional use in the production of artistic studies, portions of the roof and side facing the south may be also glazed, as on the north side, but must be supplied with an excellent system of blinds, sufficient effectually to keep out the sun when not required, but possible to be removed for the purpose of taking sunlight effects when necessary. If all the opaque parts are built of brick and tile or wood, the room would be much cooler in summer and warmer in winter than if it were built throughout of glass. The proportions I have given are the extreme in size that will be desirable. The size of the glass room is of more importance than has been supposed. A very large room is decidedly objectionable; on the other hand, it is necessary to have a room sufficiently long to admit of the use of long focus lenses, and to enable the operator to include a full-length figure.

The appearance of the room is important: this has much to do with the expression of the sitter. Mr. Sutton recommends a tunnel, partly for the singular reason that it would aid the expression. Now, to my mind, nothing can be more cheerless-looking than the interior of a tunnel, painted a dead black—roof, sides, and floor—as he recommends. I prefer that the room should have more the appearance of a moderately furnished drawing-room—light, but not dazzling—such as you might expect your sitters are accustomed to. I do not know what kind of room Mr. Sutton's sitters were accustomed to; but I do not remember ever meeting one

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[*] Read at a Meeting of the Photographic Society of Scotland, Feb. 13, 1866.

that had spent even so much as his leisure moments, to say nothing of his every-day life, in a tunnel; and in this I am supposing that our sitters are not all "navvies." It is bad enough to be taken to a strange place and be made to go through a strange operation, without the additional discomfort of being taken into an uncomfortable room.

The shape and proportions I have indicated will permit of simple elegance of arrangement, and afford space for the proper disposal of accessories and the performance of all necessary operations without inconvenience.

As a general principle, violent contrasts of all kinds should be avoided in the furnishing of the glass room, everything being kept as quiet and harmonious as possible; light objects, bright objects, and indeed all surfaces casting accidental and uncontrolled reflections, either on the sitter or into the camera, are better avoided. The wall paper should be simple and quiet in pattern, and of a warm grey in tone. The carpet should cover the entire floor, and should be well stretched and properly put down. A small pattern is best, without patches of white or light blue; a maroon ground, with a pattern in brown and black, answers admirably. The furniture should be solid and good, and as varied as possible, to enable the operator to obtain as much diversity in his pictures as possible. There should be a plain fixed background at each end, so that either side of a face may be taken with the north light. Extra backgrounds, pictorial or otherwise, should be at hand, stretched on frames, running easily on castors, so that they may be rapidly changed without effort.

Using only the north light of this room, blinds will rarely be required; nevertheless, it would be desirable to be furnished with them, to enable the operator to modify the direction and quantity of the light to suit special cases.

The subject of lighting the sitter has been so often treated, and treated as it only can be in general terms, that it is scarcely necessary for me to add any remarks on the subject. The special lighting of each sitter is, after all, a question which can only be solved by the operator when he has that sitter before him. He must see that the light and shade fall right before he produces a picture, and with the capacity of seeing this the power of modifying it is generally accompanied. As a general principle, however, a high side light, a little in advance of the sitter, is the most important direct light; excess of vertical light is, in most cases, to be avoided; nevertheless, it may be useful at times, in giving force and brilliancy to flat, common-place faces, which in themselves possess very little relief. On the other hand, where the sitter has heavy brows, sunken eyes, or prominent features, the least possible vertical light should be employed, or these features will look the more marked and heavy. With such faces, the side light, well in advance of the sitter, will give the most soft and harmonious effect without risk of flatness. The top front light will generally serve to illumine sufficiently the shadowed side of the face without the use of reflecting screens, which may, however, under certain circumstances—for instance, when the face is turned away almost to a profile—be found useful. I may here remark, although not within my immediate province, that the constant use of white reflecting screens, which some operators, using only one side light, seem to think imperative, generally arises from the much too common tendency to under-exposure amongst portraitists. If photographers would be content to get harmony of light and shadow by a fair exposure rather than by reflecting screens on the one hand and over-development on the other, much of the coarseness and hardness common in photographic portraits would disappear.

On the subject of ventilation I have not made any remarks, as it is chiefly a builder's question; I assume, however, that every photographer will feel its great importance; and above all would I urge it on those regularly engaged in operating to study the ventilation of the dark room, as an essential element in securing good pictures, as well as in securing and maintaining good health.

I have had the privilege of seeing the glass rooms of perhaps all the portraitists of any eminence in London, and a good many in the provinces; and whilst many of these are built upon plans rendered necessary by the exigencies of the positions in which they are placed, yet I have noticed that all have been, either in fact or by continued modifications of arrangement, as nearly as possible adapted to the form I have described. In some cases, where a top light alone was possible, the operator has contrived to shut off, by means of blinds, all the light, except a small portion, at the most remote corner from the sitter, thus obtaining a high side light in advance of the sitter, and so produced beautiful effects.

If I have spoken somewhat plainly in the condemnation of the theoretical whims brought before you some months ago, it is because I have had very vivid evidence of their practical mischief. What I have advanced as my own conviction is the result of my own experience in taking many thousands of negatives, in which—I say it with all modesty—I have not been entirely unsuccessful. That experience is confirmed by a somewhat intimate association with the majority of the most able photographers of the day, whose practice endorses my remarks. I may further add that I have the highest respect for the theories of the thoughtful scientific men in our art, and am happy also to add that I am confirmed in my practical views by consultation with them on theoretical considerations. If I needed to go further for authority to confirm my own practice, need I do more than appeal—and I cannot help feeling pride in doing so—to the seven medals with which your Society has honoured my poor efforts at various times?

A WORD FOR SUGAR IN THE IRON DEVELOPER.

BY WM. HISLOP, F.R.A.S.*

An animated discussion is now occupying the attention of photographers, both amateur and professional, with respect to the merits of gelatine as employed in the collodion developer. Some gentlemen pronounce it to be the long-desired and infallible producer of good pictures, while others say it is of no use. A third party comes in and tells you, that if you already get good pictures, and do not desire any improvement, why then don't try the new developer.

Now, Sir, as one of this class—or rather, I ought to say, as one who is tolerably satisfied, not with my own manipulation, but with the effects which may be properly set down to the compounds I employ—I do not quite acquiesce in the philosophical correctness of the last recommendation. I am not (perhaps to my own loss) one of the "Rest and be thankful" class in photography, or in any other science, and therefore do not like to be excluded from possible excellence because of present partial success.

Moreover, I think the proper way would be to enquire why some get good pictures by ordinary development, and others do not. Having ascertained this point, we may then observe if a new developer will improve matters; if not, we are in a better position to pronounce on its value.

I am not now about to enter into an analysis of the question of intensity. The conditions are known to every careful photographer. We know how the state of the bath and collodion influence intensity, and how it is possible to get both weak and strong pictures with the same developer by a slight modification of the condition of the bath, or of the conditions of exposure. We also know how diffused light in the dark room, and more especially in the camera, will lower intensity by producing fog.

In passing, I would just advert to an abomination which some camera makers perpetrate in their dark frames. Our lens mountings and camera bodies are generally carefully covered with a dead black on all sides, so that no rays except those required may be reflected on to the plate, and yet when you open the dark (?) frame, you often find the wood left of its natural colour, and worse still, sometimes varnished or polished, so as to give it a smooth and light surface. One of these surfaces is close to the back of the plate, and unless the film is absolutely opaque, the light which passes through at different angles in different parts must necessarily, after impinging on this bright or light coloured surface, become diffused in all directions. You cannot now keep your developer on long enough to get sufficient intensity; the shadows fog; and as soon as this begins, all further development only increases the difficulty of printing, without increasing the vigour or contrast of the picture one whit.

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* Read before the North London Photographic Association, Feb. 7th.

To any amateur troubled with fogging or want of intensity, I would say, first look at your dark frame. If you have a light coloured back to it, reflecting light in all directions, just lay a piece of black velvet over it, and then try a picture or two, and if your chemicals are not in fault, you will not be troubled with fog or want of contrast.

But to return to developers. I am about to draw down a heavy censure upon my devoted head. I am going to ask members to try back, and use an agent suggested long ago, but apparently now forgotten or neglected. It is sugar—simple loaf sugar—and nothing more. I do not think it of much use to give formulæ, as these must be varied to circumstances; but I may observe that I chiefly use a 15 or 20-grain solution of protosulphate of iron, with not less than 50 grains of loaf sugar. No alcohol is required, and very little restraining acid. In fact, an old solution of protosulphate of iron which has turned brown may be used where great intensity is not required, for I find that acetic acid judiciously employed generally increases the intensity of detail. I have employed a definite compound known as the saccharo-sulphate of iron, but as the solution requires the addition of more sugar to make it slightly viscid, I prefer the simpler method of using protosulphate, and adding the quantity of sugar which I find by experiment to meet the condition of my bath and collodion.

The solution may be used as an intensifier with a second dose of nitrate, and there is no loss of half-tone. Sugar may be obtained anywhere; there is no danger or difficulty in the preparation; and there is no uncertainty as to the restraining power of the agent employed, as appears to be the case with other substances.

Honey and treacle have also been suggested for a similar purpose, and will no doubt answer that purpose; but from the fact that these compounds are not absolutely uniform in various samples, their use is not so convenient or certain as that of the simpler substance, the employment of which I advocate.

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PHOTOGRAPHY IN THE ZOOLOGICAL GARDENS.

BY FRANK HAES.*

In laying before you this evening an account of mishaps and misadventures I had in photographing the second series of the wild and tame animals at the Zoological Gardens, during the past summer, I am sure that I shall not be able to present anything new in a photographic point of view. It was rather late in the season when I commenced working at the Gardens, in which, thanks to the kindness of the Society and its able officers, every possible facility was as before afforded me.

I was desirous of trying to photograph some of the horses at the Islington Horse Show, for which I had received the kind permission of the Secretary, and have now the pleasure of showing you portraits of several of the winners of the prizes there, amongst others that of "Caractacus," who won the Derby in 1862, and who has for two years taken the first prize at Islington for racing stallions. These horses were very difficult to photograph, for the confusion and excitement caused by the noise and the presence of so many persons and horses of course made these stallions very irritable. "Caractacus" was more troublesome than any, for his groom, thinking he knew better than I did in what position I required the horse, would, just as the animal was quiet, jerk on the leading rein, and so startle and annoy this fine creature, that several times, after having everything quite ready for exposure, I had to snatch up the camera and run, as I saw on the ground glass a sort of phantasmagoria of the horse getting larger and larger. The owner of another prize horse, "Motley," which I was anxious to take, as being the only living stallion of the famous "Touchstone" breed, tried a still more novel way of inducing the animal to be quiet, by striking him on the nose with a roll of paper which he had in his hand; of course the result was, as you may well imagine, an absolute failure, in spite of several attempts and requests not to persist in this treatment. The celebrated American trotter "Shepherd F. Knapp" was much less trouble, and I soon had two negatives of him. The premises of the Agricultural Hall are certainly not adapted for photography, and the light is not sufficiently good for rapid working in such a densely-populated part of London; besides which, the weather during the whole of the week was very unfavourable, as it rained almost every day.

The Horse Show over, I removed to the Zoological Gardens. I worked with the same lenses and camera as last time, using also the same collodion (Rouch's ordinary bromo-iodized) and the same formulæ for the chemicals; but in one respect I had a great advantage. I last year used Smartt's tent, and, as you may perhaps remember, it was blown over on a windy day, when of course everything was broken, and the whole of a fine 88-oz. bath was sucked up by the earth. This year I used one of Messrs. Murray and Heath's new box tents, which is here this evening, and which, as far as I can judge, is all that can be desired; it contains everything except the tripods, and I have used it for hours exposed to the full rays of the sun, though of course this is not advisable. Not being satisfied last season with the Sœhnée varnish, I this time used Thomas's—which is much harder—varnishing every negative twice, in the manner recommended by Mr. G. Wilson; I have found that the negatives thus protected suffer less in printing from contact with the silver paper.

I shall now proceed to describe the slides, which I will take in their order from No. 1. The Chimpanzee, the late Miss Sarah, was not as good tempered as the Orang Outang, and I had a great deal of trouble in persuading her to be quiet; however, by dint of perseverance, I succeeded in getting three negatives.

To make my series more complete, I now wanted a specimen of the Monkey tribe, and we tried several of the best-tempered ones in the collection; but I was never more baffled in my life, for all these creatures had a decided objection to my taking a portrait of their faces. They often allowed me to focus and put in the plate, and when just ready, round would turn the monkey, giving me a very fine view of everything except what I desired. In fact, I had to give it up, but think I could manage a tame one, which was accustomed to be handled.

The Ruffled Lemur was very little trouble, but it does not make a nice picture, as the keeper was obliged to hold its head to keep it quiet.

The next on the list, the Aye-Aye of Madagascar, is very rare and curious. Very few visitors to the Gardens see this, the only living specimen in Europe, as it is a nocturnal animal. There was no way of focussing it but by marks on the box in which it was placed for me; because, if the lid had been opened, it would immediately have covered itself with its beautiful bushy tail. When quite ready, the lid was suddenly lifted, and it was photographed before it had time to think about the sudden glare of light in which it found itself. Although I tried several times, I only obtained one negative; all the others were useless.

A very fine Bat, which hangs all day quietly in its cage, I purposed making my next subject. With this intention it was removed into a bird cage, and left some hours to become accustomed to the change. I then prepared to photograph it, but was obliged to relinquish it, as the animal was constantly clambering over the wires.

The handsome clouded Tiger was my next; and as I knew that at a regular time, any fine warm day, I should find him sunning himself on the branches in his enclosure, I did not need any particular precaution. This photograph, and several of the following ones, are much spoilt from the effect of the bars, which are very small and close; and the doors were so placed that they could not be opened, neither was there room enough in the enclosure for me to go inside with the animals.

The photograph of the Binturong is a failure, not from the animal moving, but from the bars. It is a sulky brute, and gave some hours' work, besides biting the keeper.

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* Read before the North London Photographic Association on Wednesday evening, February 7.

The Esquimaux Dog was given to the Society by Lord Dundreary. It is said he is the only survivor of a number used in one of the Arctic exploring expeditions in search of Sir John Franklin. This is a fine animal and of immense strength; his temper is none of the best. Coming from such a cold country, he did not care about our warm summer, and panted heavily. I made many attempts, and at last had to be satisfied with but an indifferent picture.

The Dingo looks in the photograph just like what it really is, a great cur. They are powerful animals, and a pest in Australia. When in the bush, I have heard their horrid yelling night after night. They hunt in packs, and are a great nuisance to the squatters.

The Ratels must be well known to almost all visitors at the Gardens, as one of them is always walking round a circle it has made for itself, and at a certain spot throws (in passing) a somersault, and then continues its peregrinations. I have watched it for a long time, and it has never failed to go head over heels with the greatest care at the same spot, just as if it were performing some important duty. These are not easy animals to handle, for they bite most severely. We trapped one into a cage, but without the stereoscope you cannot make out much of the details. The back is quite white, and the other part of the body black, all of which increases the photographic difficulties.

I may here remark that it is somewhat singular how few animals are of a colour favourable for photography; various shades of yellow and red seem to prevail; and even brightly-plumaged birds are but poorly rendered in the present state of our knowledge of this scientific art.

The next in my list is the Tasmanian Devil, and well he deserves his name, for a worse-tempered brute it would be difficult to find; he came at us open-mouthed, and, notwithstanding repeated repulses, was always ready to charge. We had to be careful that he did not succeed in biting us, for he holds with bull-dog tenacity. After tiring him well out, the keeper skilfully and quickly lifted him up on a hutch, on which he remained quiet long enough for my purpose.

The Coypu Rat I shall only mention to say that here again the rails in front quite spoil my photograph, although the animal was quiet.

The pretty little Prairie Dog, or Marmot, was an agreeable change, giving no trouble; so I will pass it over for—

The Leucoryx, a fine specimen of the antelope tribe, and, like all of this kind, so restless and suspicious of any unusual sight, that it was some time before it was even advisable to prepare a plate; even the keeper despaired of ever having a picture of it. The great difficulty with all these animals is, that they will face the camera and watch your every movement until attracted by something still more novel.

In photographing large animals, it should always be remembered that a mere (so to say) elevation, or perfect side view, will never do justice to the real form; and it is principally in the form that the great beauty of the lower order of animals is found; so it is always worth a great deal of trouble to get the creature to stand so as to show all four feet distinctly; this is easily seen by referring to the various stereograms now before you.

The Addax, another antelope, was not much trouble. Not so, however, the common Gnoo, which is a young animal only lately arrived here, and has not yet learnt all the wicked ways of his predecessor, who was last summer sent to Holland in exchange for other animals. I went into his enclosure, and, although he wanted to run all round it, three of us managed to gradually confine him in a corner. Whilst engaged on this subject, I was much annoyed by persons passing, who, seeing what I was doing, would stop, and either feed the Gnoo or tease him with their sticks through the rails.

The Blessbok was very troublesome, and as the particular part of its inclosure which it affects is shaded by a tree, I found that I could do best by selecting a time when the sun was obscured. As you see him he is watching some leaves held by his keeper.

The Goats next claim our attention, commencing with the Ibex, which is a very fine specimen. He was chained up, as he has an unpleasant habit of butting very powerfully, although not so dangerous as the Markhoor or Snake-eating Goat of India. This was an old favourite at the Gardens, where he lived about ten years. It is likely to be some time before the Society acquires another such fine specimen, as they are a wary and as fleet as any known animal, and are only killed by the exercise of the greatest skill in stalking. Before cooking your hare, first catch it, says the old proverb; and never better illustrated than with our friend here, for the keeper could not venture into his yard until he was fastened up; for this purpose, it always wore a strong collar, and, when necessary to catch him, the keeper brought a handful of wheat and called him, having a heavy chain on the ground in readiness; the knowing fellow would come, eat the corn out of his hand, and watch, with one eye on the corn, and the other eye on the other hand, with which the keeper would endeavour to seize his beard. This, by the way, is a goat's weak point: always seize the beard if you want to master one. Very often this game would go on for an hour or more; sometimes the keeper would succeed at once. As soon as he had the beard in his hand, the chain was fastened to the collar, all this being done through the bars; he was then chained up, and my troubles were soon over. But this preliminary exercise did not do much to improve the hand for the requisite steadiness in working; and, as I generally found the hotter the day the better the picture I could produce, you will believe that after five hours daily of this hard work I was usually very tired. If it had not been for the annoyance and unfeeling interruption of the visitors, I should have been able to have photographed the Markhoor in the same position as the next one, which is the Cretan Goat.

The Deer are almost as nervous as the Antelopes. The one now before you, the Formosan Deer, is a beautiful creature. I was anxious to take the splendid Axis Deer; but it was impossible, as, if I had attempted to take the camera inside, there was every reason to believe that it would have leapt on the roof of the shed; and this could not be risked. Peron's Deer is not a very attractive animal. The next is rather a curiosity, being born in the Gardens, and only four days old when I photographed the pretty timid thing.

(To be continued.)

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Proceedings of Societies.

The London Photographic Society.

The Annual Meeting of this Society was held on Tuesday evening, Feb. 13th, Dr. H. G. Wright in the chair.

The Chairman read a letter from the Lord Chief Baron, regretting his inability to be present.

The minutes of a previous meeting were read and confirmed.

The Chairman, in answer to a letter received by the Secretary, handed Mr. Dawson a nomination paper to get filled up.

Mr. Dawson wished to ask if he were a member of the Society, and proceeded to read a correspondence between himself and the Secretary. He stated that in sending in his resignation on December 7th, he said that resignation was to take effect when the period for which he had paid his subscription had expired. On the 19th of the same month a resolution of a Special Meeting asked him to withdraw his resignation, which he did, and he contended, therefore, that he was still a member of the Society.

The Chairman said that Mr. Dawson's resignation having been tendered and accepted, it was absolutely necessary that he must go through the proper form for the admission of members. The correspondence referred to having taken place, he had, as a matter of courtesy, afforded Mr. Dawson an opportunity of explaining. They would now proceed to the business of the evening.

Mr. Ridgway was about to make some remarks on the subject, but was interrupted by the Chairman, who said the matter was closed.

Mr. Dawson said it was not closed until he had received an answer to his question as to whether he was a member.

Mr. Mayall said, as a member of the Council, he had no hesitation in answering that Mr. Dawson was not a member. His resignation having been accepted, he could not be re-created a member by the resolution of a Special Meeting. Such a resolution only had the effect of a recommendation. The Council had considered the question, and had ascertained that there was but one method of a person being re-admitted, which was by the ballot. It now remained for him to forward his name, properly proposed, to the Council, who could then submit it to the meeting for ballot in the usual way.

Mr. Dawson repeated that his resignation was prospective, and had not taken effect.

The Chairman said that at present Mr. Dawson was not a member of the Society. They would now proceed to regular business.

Mr. J. Wergo and Mr. J. C. Belton were duly elected members of the Society.

The Chairman then said the next business was the election of officers to supply vacancies occurring. The following gentlemen were proposed for election or re-election. For

President:—The Lord Chief Baron.

Vice-Presidents:—Mr. Bedford, Mr. Glaisher, and Dr. Wright.

Treasurer:—Mr. H. White.

Council (in addition to those remaining in office): Mr. Durham, Mr. Jabez Hughes, Mr. Russell Manners Gordon, Mr. W. Warwick King, Mr. Kater, and Mr. Hamilton.

These gentlemen were duly elected.

The Chairman then read the

Annual Report of the Council.

It is the duty of your Council to lay before the Members of the Society at each Annual Meeting a Report of the general concerns of the Society for the preceding year.

In presenting the Thirteenth Annual Report of the London Photographic Society, your Council may express their confident belief that the photographic art has continued to steadily advance throughout the past year, and refer with justifiable pride to the many valuable and interesting communications laid before the Meetings of the Society, and which specially indicate an increased interest in all that concerns the scientific progress and commercial advancement of photography.

It will be seen from a reference to the balance-sheet hereto appended, that the ratio of expenditure and receipts is in accordance with that of former years, and that the ordinary expenses of the Society have been within the income of the year.

During the summer months the Society opened an Exhibition in Conduit Street, in conjunction with the Architectural Society.

The space, although somewhat limited, afforded ample room for proper exhibition of all the varieties of beautiful photographs which were exhibited, and it may be safely affirmed that no Exhibition has exceeded in interest that of the past year; in fact, it may be asserted that general excellence in the specimens far excelled all former Exhibitions.

Although this Exhibition was well attended, and conducted almost free of expense to this Society, it was not financially successful: the general distribution of photographs throughout the country, and their now forming an object of attraction in almost every family, together with the fine collections for sale, not only in London, but in all the chief towns of the kingdom, render it very improbable that any Exhibition can ever offer sufficient attraction to induce visitors to attend it in sufficient numbers to be remunerative to the promoters. For whatever success may have attended our last Exhibition, and for the comparatively small expense entailed on the Society, it was indebted to the exertions and support of Mr. Cole, one of the members of the Council. That gentleman was not only instrumental in bringing about the favourable arrangements with the Architectural Society, but he also gave a guarantee against loss. Your Council feel that the most cordial thanks are due to Mr. Cole for his perseverance and liberality in the matter.

The promise made on the occasion of the last Anniversary, to present to the meetings a series of good papers, has been most fully maintained. During the entire year, on no occasion has there been any deficiency, and on some of the evenings the meetings have consequently been prolonged to a much later hour than is usual.

The following papers may be mentioned as some of the more important ones, and your Committee feel called upon to again especially thank the authors for the willingness with which they have responded to the call which was made on them, and the excellence of the papers:—

Mr. G. Wharton Simpson, on a New Method of Printing, and the Preparation and Use of Collodio-chloride of Silver.

Mr. Willis, on the Aniline Process of Photographic Printing.

Mr. Dallmeyer, on a New Form of Landscape Lens, including a large angle of view.

Major Russell, on Dry-plate Photography.

Mr. Pettitt, on Photo-Binography.

Mr. Ross, on some Early Lenses and Cameras, accompanied by illustrative and early photographs.

Mr. Hughes, on the Preparation of the Iron Developer, so as to produce Dense Negatives. Also a second paper on the same subject.

Mr. Henry Cooper, Jun., on Printing with the Salts of Uranium. On an Improved Formula for making the Organico-Iron Developer. (Two communications.)

Mr. N. K. Cherrill, on the Organico-Iron Developer.

Mr. Walter B. Woodbury, on a New Photo-relief Process. (This paper was illustrated by the author.)

Mr. Mayall, on the Construction of a Photographic Glass Room.

The objects exhibited at the Ordinary Meetings have been numerous, and some of the greatest possible interest; amongst which may be especially recorded the earliest specimens of carbon printing—those executed by M. Poitevin in 1855—also the latest results of Mr. Swan's researches, and which have reached a degree of perfection that can scarcely be surpassed.

The Council regret that some observations made by the Editor of the 'Journal,' on the communication of Major Russell, and which they believe were not intended in the light in which Major Russell views them, together with some other causes, led to an invidious attack on one of your Vice-Presidents; and at the meeting of the Council (twelve members being present) held in December, a resolution was unanimously adopted, expressing the full conviction of the Council that the statements made in the *British Journal of Photography* of November 24, 1865, personal to Mr. Glaisher, were entirely unfounded and unjustifiable.

In reference to this matter, a Special Meeting of the members was convened, the results of which have been faithfully and truly recorded in the 'Journal,' and to which it is not needful to further allude; your Council feel satisfied with the results, and that the honour of the Vice-President, so unjustly assailed, has been fully vindicated.

The medal which has been awarded is now prepared, and an impression* is this evening laid before you. It may, the Council believe, be considered a work of high art, equalling, if not excelling, any similar productions. In the course of a very short time those already awarded will be delivered.

Mr. Durham has kindly consented to execute, and will present to the Society, a medallion portrait of our President, the Lord Chief Baron; and from this will be, as soon as possible, produced another die, so that the proposed "President's Medal," destined for such purposes towards the advancement of the art as the Council shall think fit, will be soon proceeded with.

The Council cannot conclude their Report without alluding to the pleasure and advantages resulting to the Society by acting in unison and friendly feeling with other societies; and with satisfaction they refer to the good understanding which exists between the Council of the North London Photographic Association and their own body, by which the 'Journal' of the Photographic Society of London has become the official organ of that Association, in addition to that of the Photographic Society of Scotland, with which institution this has so long and so agreeably been associated.

Mr. Hughes proposed its reception and adoption, and congratulated the Council and Society on the satisfactory account rendered of their position, and the activity and interest which the list of papers read indicated, which contrasted very favourably with the state of the Society some years ago. Regarding the unfortunate misunderstandings to which the report referred, he felt the Society was quite right in investigating charges reflecting any dishonour on their esteemed Vice-President, to whom so much of the prosperity of the Society was due; and they had proved throughout that he was in every way entitled to the thanks and support of the Society.

Mr. Bedford seconded the resolution, which was carried.

Some interesting discussion ensued on Sarony's Posing Apparatus, on National Photographic Portrait Galleries, &c., which the pressure on our space compels us to leave over until next week. After these the proceedings terminated.

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* This is in soft metal; one of the dies, after it was entirely completed, failed in the hardening—a piece having, from some unexplainable cause, come from the centre of the reverse; and it is thought advisable not to run another risk of damaging the die until it has been fully tested.

South London Photographic Society.

The usual Monthly Meeting of the South London Photographic Society was held at the City of London College on the evening of Thursday, Feb. 8th, the Rev. F. F. Statham, M.A., F.G.S., in the chair. The minutes of a former meeting having been read and confirmed, Mr. J. Bockett and Mr. T. Ross were elected members of the Society.

Mr. McLachlan's circulars, calling attention to the establishment of national photographic portrait galleries, were brought before the members.

Mr. **Wallis**, of the Art Department, South Kensington, delivered an interesting address on Elementary Art as relating to Photography (see p. 74).

After a few words from the **Chairman** and a vote of thanks,

Mr. **Wall** made some comments on Mr. Wallis's remarks. On the wig-like effect of hair in some photographs, he observed that it was chiefly due, he thought, to the fact that the cast shadows of the hair were lost in the photograph. Referring to the photograph in which the water formed two lights of equal intensity, it probably might have been avoided by lowering or raising the camera a little. Referring to the plan of lighting in which the head was kept chiefly in shadow, he mentioned a picture by Mr. Robinson, which was a charming illustration of this, but had too dark a background. Regarding Mrs. Cameron's pictures, he objected to their style altogether, as being out of focus, also involved being out of drawing, and for figures in shadow she substituted figures in fog. It was true she had produced some beautiful things, not in consequence of her style of working, but in spite of it. Referring to Sir Thomas Lawrence's method of defining the lines of the eye sharply, he might mention an observation by an old artist, Mr. Aldis, who had pointed out to him that in the photograph, when he got the eyes right, all the rest of the face was good.

In answer to a question,

Mr. **Russell Manners Gordon** explained that, in taking a certain picture in which the reflections of the trees on the opposite bank of a stream were beautifully secured, and all glare of light avoided, he had placed the camera on the ground.

Mr. **Wall**, referring to the phrase that the camera was a one-eyed instrument, said he thought the large size of the lenses employed gave them something of the power of looking round things possessed by two eyes.

Mr. **Wallis** said, that the camera was a one-eyed instrument was a simple truth which could not be gainsaid. He had often been struck with the singular accession of interest gained by examining a stereoscopic picture in the stereoscope, the halves of which, viewed as single pictures, seemed to have no interest at all. The "artist's eye," sometimes talked about, possessed the power of seeing things on the flat, reducing things on many planes to one plane. Regarding Mrs. Cameron's pictures, he must not be misunderstood as admiring them generally.

Mr. **Wall** said Mr. Leake had just suggested the importance of photographers examining the light and shade on the sitter, himself, instead of on the ground glass.

Mr. **Sebastian Davis** said, in reference to Mr. Wall's remark that one lens, however large in diameter, could not give the effect of relief produced by the superposition of the two images seen by the two eyes, or two stereoscopic negatives. Besides, however large the lens, it was generally used with a small stop.

Mr. **Wall** said he did not profess to enter into the matter himself; he had merely quoted an idea published by Sir David Brewster.

After some further conversation, a discussion arose on Mr. Werge's paper on Backgrounds, Mr. Wall maintaining that as painted backgrounds were merely conventional representations, Mr. Werge's views on correct drawing were not applicable. After a brief discussion, in which Mr. Wallis, Mr. Blanchard, Mr. Werge, Mr. Wall, Mr. Simpson, and the Chairman took part, it was resolved that the subject should be resumed at another meeting.

Mr. **Wall** then offered to read a paper at the next meeting on "Matters of Fact in Art."

It was also announced, that at the April meeting Mr. Davis would read a paper on "Mr. Ackland's Modification of the Fothergill Process."

North London Photographic Association.

The usual Monthly Meeting of the North London Photographic Association was held on Wednesday evening, the 7th instant, in Myddelton Hall; Mr. Hislop in the chair.

The minutes of a former meeting having been read and confirmed,

Mr. **Edward Dunmore** and Mr. R. L. Allan were elected members of the Society.

The **Chairman** called the attention of the members to some circulars explaining Mr. McLachlan's scheme for local and national collections of photographic portraits, and also to a series of carbon prints by Mr. Swan, one, a production of Herring's Horse Fair, about 24 inches by 17 inches, being especially admired for its richness, force, and delicacy; also to some prints, chiefly reproductions of engravings taken by Mr. Ross's ordinary angle doublet, the absence of distortion, and good definition, being the chief features to which attention was called.

Mr. **Hislop** having vacated the chair (which was occupied *pro tem.* by Mr. Simpson), read a paper entitled "A Word for Sugar in the Iron Developer" (see p 77), and exhibited some fine examples of the results obtained by the saccharated developer.

Mr. **Allan** said he was one of those who had not succeeded satisfactorily with the organic developer, although he had seen excellent results obtained. He exhibited a fine large portrait, produced by one application of the ordinary iron developer.

Mr. **Dunmore** exhibited some very charming 12 by 10 landscapes, the negatives of which were obtained by the organic iron developer, the plates, in some instances, being kept an hour before development.

Mr. **Martin** endorsed Mr. Hislop's recommendation of sugar. It had, moreover, the advantage of being a definite crystallizable body; whilst gelatine was indefinite and changeable. Sugar, moreover, formed a definite double salt with the sulphate of iron, and he thought it should be the aim of photographers to use definite compounds as much as possible in their work.

Mr. **Bockett** mentioned glycerine as a body giving most of the advantages claimed for the gelatine developer. He had also found that formic acid tended to give great softness in conjunction with the organic developer.

Mr. **Wharton Simpson** said glycerine was an agent he had frequently used, and he found it had many of the advantages claimed for the general viscous developers; but it had this disadvantage, that it was decomposed by the slightest trace of free nitric acid; and as this acid was frequently used in baths, and as in prolonged development there was nitric acid evolved by the silver thrown down, obstacles were presented to its use. With regard to formic acid, it had been mentioned repeatedly of late as possessing special value in connexion with the organic iron developer, as tending to shorten the time of exposure, and also producing delicacy. As far as the results produced by Mr. Hislop and Mr. Dunmore, in the charming pictures now exhibited, might guide them, there was sufficient to justify all that had been said on behalf of each developer. The foliage in Mr. Hislop's landscape was exquisite, and he thought that nothing exceeding the beauty of Mr. Dunmore's pictures had been exhibited for a long time. The choice between them, therefore, must rest on other considerations than the excellence of result. Probably—and that must be proved by practice—if it could be shown that the addition of sugar in all cases would produce the same effect as gelatine, it would be the more desirable agent. It was a compound of a more definite character, and was always more readily accessible; and should experience prove that results might be depended upon with equal certainty and uniformity, it would have a decided advantage.

Mr. **Frank Haes** then read an account of his experiences in photographing the animals in the Zoological Gardens (see p. 78), and exhibited a number of fine stereoscopic specimens.

Mr. **Martin** asked if the animals were taken to scale, so as to afford a proper comparative view of the size of the animals.

Mr. **Haes** said that such a course would have been impossible. It was necessary to secure the animals in any position and at any convenience in order to get them at all; and besides, some of the small animals would not have made pictures at all if taken to scale.

The nomination of officers for election at the ensuing meeting was then made.

Mr. Haes then proceeded to exhibit some of his recent photographs of the animals in the magic lantern, the excellence of the definition of all, and the admirable poses of many, exciting general approbation. Altogether, we have rarely seen a series of photographs for the lantern so perfect technically, and so full of educational interest.

After some votes of thanks the proceedings terminated.

Mr. Dunmore will read at the next meeting a paper on "Photography and Art."

Correspondence.

ON THE EQUAL DIFFUSION OF NATURAL LIGHT, OR LIGHT FROM SPACE.

Sir,—There is no need of experimental proof to satisfy the photographer that natural light proceeds to the earth in straight lines from every part of the sky; his experience is sufficiently convincing to impress this fact upon the mind without the possibility of doubt; it is only when the accuracy of the old belief, that every ray of natural light primarily proceeds from the sun, and that their multifarious changes of direction are caused by the reflection and refraction the solar rays suffer in their passage through the atmosphere, is called in question, and its truth denied, that there is raised the necessity for strict and accurate scrutiny.

The first faint streaks of approaching day, and the gradual strengthening of light before the visible appearance of the sun above the horizon, its equally as gradual fading into the darkness of night after sunset, have been attributed by philosophers to the refractive and reflective power of the atmosphere upon the passing solar beams. That the solar rays are refracted in their passage through the atmosphere is sufficiently evident; and it is this refraction which enables us to see the sun apparently above the horizon when actually below it; but as it is equally as evident that the refractive power of the atmosphere commences and ceases with the visible appearance and disappearance of the sun, it is perfectly plain that refraction has no share in the prolonged duration of natural light, called twilight, before sunrise and after sunset.

No experiment yet described has demonstrated the possibility of natural light suffering reflection in its passage through a clear atmosphere. It is perfectly true there is present in the air infinitesimal particles of atmospheric dust which are capable of reflecting solar light, and thus rendering their presence visible; and also it is well known that the air is often filled with watery globules, capable also of reflecting light from their surfaces; but the experienced photographer knows full well that the diffused light of the northern sky, which illuminates his studio, is never so powerful as when it reaches him through a clear atmosphere. He wants no reflecting surfaces to obstruct the light of the open sky; a clear atmosphere at a temperature not sufficiently elevated to convert rays of actinism into heat suits best the requirements of the photographic portraitist. If, then, this is the experience of the photographer, and it can be demonstrated that the atmosphere has no power of reflecting light, to what is the prolonged duration of twilight and the direct transmission of light from space to be attributed?

If it is the belief that solar light is a direct emission from the sun through space, no sufficient explanation of these phenomena can be made; but if the idea is accepted that light is caused by the passage through the atmosphere of a force which pervades the universe, and of which force the sun (in common with the fixed stars) is the source, why then a reasonable explanation can be given.

The earth may be broadly described as an association of various elements of matter collected and bound together by an impalpable force or material fluid called cohesive attraction; it is surrounded by an atmosphere which decreases in density from the surface upwards; it floats in space, performing a diurnal revolution on its axis, caused by solar action, and at a certain determinate distance, through this axial revolution, an annual course round the sun. Pervading the universe in which the earth, thus constituted, floats, is a subtle ethereal fluid, the action of which on matter is of a totally opposite character to cohesive attraction; it is a force of separation, and would, if unchecked by cohesion, divide and scatter the materials of the earth into their original atoms. It is thus to be understood that the earth is surrounded and pervaded by a force inimical to its condition as a solid globe, and which is only prevented from destroying it by its inherent force of cohesion. As the sun is the source of this force of separation, the surface of the earth opposite this body is exposed to the direct attacks of the solar rays proceeding from it, the rapid passage of which through the atmosphere produces the effect of solar light; but not only does this force, thus proceeding from the sun, produce light in passing to the earth, but also its action enables the whole of this force to penetrate the atmosphere in every direction from space with sufficient velocity to produce light, a certain rate of speed in its motion being necessary for this effect. It will be readily comprehended that this velocity of passage is not directly stopped by the cohesive force on the setting of the sun, but gradually fades as it acquires the necessary power; similarly, it increases as gradually with the approach of the sun to the horizon, thus causing the phenomenon of twilight, and showing the nature and source of diffused light. Thomas Ayers.

STUDY OF ART BY PHOTOGRAPHERS.

Sir,—In your admirable article "On the Study of Art by Photographers," you have laid down a line of study by which photographers can arrive at art knowledge. All who love common sense as opposed to "fustian" must agree with you when you say, "We have regretted at times to notice some, who have undertaken to write on the study of art in connection with photography, deride the idea of art rules, and, soaring into a region of æsthetic ecstacy, become lost in a cloud of words." A wonderful example of this kind of art-teaching occurred in one of the photographic journals, curiously enough, on the day your article appeared. Here it is, and you will find it to be—

"A fine example, on the whole,
Of rhetoric, which the learn'd call rigmarole."

"Only an artist who has studied despairingly the marvellous, all-pervading harmonies of nature can understand the exquisite delicacy, the indescribable refinement, with which part is linked to part in every scene and every object he studies. To those who are ignorant of such beautiful secrets, who have never yet penetrated these awe-inspiring mysteries, my remarks may appear hypercritical and uncalled for. Content with nice, easy, little, molehill art-efforts, such as can be accomplished by careful scissors and skilful vignetting, they may, in the profundity of their satisfaction, ignore *the existence of all heaven-piercing mountains, and attribute to the imaginative brain of an artist that sublimity of unity which reigns throughout the universe and governs the whole scheme of creation.*"

The heading of the paper in which this profound passage occurs is "*Practical* Art Hints." The whole article is to the same tune, and is an admirable illustration of the "Practical Art" attempted to be taught to photographers for some years. May I ask, how are we to obtain any knowledge of art, if our teachers talk such nonsense as this? Butler must have taken a peep into the future and had such writers in his eye when he said:—

"But when he pleased to show't, his speech
In loftiness of sound was rich;
A Babylonish dialect,
Which learned pedants much affect . . . .
He'd run in debt by disputation,
And pay with ratiocination;
For he could coin or counterfeit
New words, with little or no wit;
Words so debased and hard, no stone
Was hard enough to touch them on;
And when with hasty noise he spoke 'em,
The ignorant for current took 'em!"

And with a marvellous prescience, or a knowledge of the character of charlatans in all ages who boast of a knowledge to which few can attain, he further describes, by anticipation, those writers whose frequent mis-applied quo tations from Ruskin, Reynolds, &c., are so calculated to bewilder and mislead art students. He says:—

> "Knew more than *forty*[*] of them do,
> As far as words and terms could go,
> All which he understood by rote,
> And, as occasion serv'd, would quote;
> No matter whether right or wrong;
> They might be either said or sung.
> His notions fitted things so well,
> That which was which he could not tell,
> But oftentimes mistook the one
> For th' other, as great clubs have done."

Again asking how we are to study art, if what I have quoted be art-teaching, I am, yours, ANTI-HUMBUG.

STUDIES AND PICTURES.

SIR,—Permit me—but in no spirit of ill-natured fault-finding—to ask "Respice Finem" why he thinks the practice of giving a subject-study its title after its conception should be denounced with such prudishly conceived expressions of dignified reproof?

The touchstone of legitimacy in this case is success. If the subject and its title are in perfect accordance, what matters whether that title was chosen before or after the execution thereof; whether the title was chosen as aptly expressing the subject, or the subject as aptly expressing the picture? Many young painters and good photographers live by selling their studies, and, to sell, give them titles. I see no reason why in all honesty and fairness they should not do so. Why, then, denounce so grandiloquently a system good and useful in its results, merely because, in the hands of the incompetent, it begets absurd failures?

To advise photographers to adopt a method of study which shall ignore "studies" is a very novel, and, to me, mysterious recommendation; and I think finished "pictures" produced without the execution of preliminary studies would in themselves be nothing but studies, and therefore, in nine cases out of ten, anything but finished pictures.

Permit me also to remind "Respice Finem," that to study the lighting photographically with a bust of plaster would be a very different matter to studying the same subject with the living figure for a model. In the one case the difficulties are few; in the other they are numerous. In the one the effect is simple; in the other, complex. In the one we have a surface uniform in tone, texture, and colour; in the other, we have a large variety in surfaces differing in colour, texture, and tone, in degrees of glossiness, &c., &c.

What is half a talent? I have heard of varieties and degrees of talent, but never before heard of their arithmetical division into halves and quarters.—I am, sir, yours obediently, AN ARTIST.

[If we understood "Respice Finem," he did recommend photographers to study, but not to display their crude "studies" as pictures; we must leave him, however, to defend his own position. We are scarcely called upon to explain the meaning of Mr. Carey Lea's phrase, "half a talent," quoted by our correspondent; we are, however, *half inclined* to do so. We are *half afraid* that unless he has *half an idea* of the meaning, it will be difficult to make it clear. Mr. Lea is not one of those described by Horatio, who

> "Speak things in doubt,
> That carry but *half sense*;"

nor yet one of those of whom Macbeth speaks, as possessing

> "*Half a soul* and a notion crazed."

He uses the English language in the sense which is usually understood, and the good services he has done to photography—and that in no *half-hearted* manner—should protect his writings from verbal quibbles.—ED.]

Photographic Notes and Queries.

ORGANIC IRON DEVELOPER.

SIR,—In an article in your last impression, the writer speaks of the "opinion (*notion*, as he calls it) of Mr. Debenham and others" respecting the quality of images obtainable with a single application of the developer. What I said at the last meeting was not in reference to the number of applications, but to the use of iron as the intensifier, which I consider increases the density of the light half tones out of proportion to that of the highest lights, thus robbing the photographs of those minute "tips" of light certainly observable in nature, and as valuable, I think, as the specks of bare glass you have often referred to, and requiring a greater amount of intensity to obtain an equal effect of power. I quite admit that this peculiar property may be advantageously employed in sunlit views, and in other cases where the high lights are unpleasantly large.

Your contributor goes on to affirm that the "notion" of myself and others is heterodox—incorrect *in toto.* This language is rather that of a professor instructing his class of students than of an ardent controversialist maintaining a disputed point.

I think it must be admitted by the careful experimenter (however dogmatically the contrary may be asserted) that the action of gelatine is essentially retarding, and, other things being equal, the addition of it must demand a longer exposure. Of course there may be instances where this is of little moment—as in copying—and its intensifying power may then be taken advantage of.—I am, sir, yours obediently,

158, *Regent Street, Feb.* 12, 1866. W. E. DEBENHAM.

Talk in the Studio.

COMPLIMENT FROM AMERICA.—Our readers will learn with pleasure that Mr. G. Wharton Simpson, the Editor of this Journal, has just received a high honour in America—the more gratifying because quite spontaneous—having been created an M.A. in two colleges in the State of New York. The announcement is contained in a very complimentary and kind letter from Dr. Towler—who holds several professorships in the colleges—from which we make an extract. He says: "It becomes my duty and pleasure to inform you that the Trustees of Hobart College, and Geneva Medical College, at the recent medical commencement on the 23rd instant, conferred upon you the title of Honorary M.A. *(Magister in Artibus)*. Although far away from us, you will see by this action of the learned body of Trustees that there are those who know how to estimate your high qualifications, and to take measures to express their sense of them."

PHOTOGRAPHY ON PAINTER'S CANVAS.—Our able collaborateur, "The Photographer's Assistant," has just discovered a satisfactory method of photography on canvas without the aid of gelatine or other hygrometric substance, or any material likely to be less durable than the prepared canvas itself, the usual prepared surface being rendered sensitive. We hope shortly to publish details.

ELECTRO-PHOTOGRAPHY.—We quoted, some weeks ago, from the *Pall Mall Gazette*, a paragraph giving a somewhat obscure account of a new process of photographic engraving, which had been employed in illustrating Rogers's "Pleasures of Memory." We have since had an opportunity of inspecting various of the prints, plates, &c., produced by the inventor, Mr. Charles Hancock. As the process is not patented, Mr. Hancock does not divulge the details of his process at present; but we may give a general outline of the operations and results. The final aim of the process is the production of a raised block which will print with ordinary type, like a woodcut, and those examples we have seen appear to leave nothing to be desired. At the commencement a negative can be taken from the drawing or design on paper, to be reproduced; or a plate of glass, being coated with a powdery collodion, excited, exposed, and developed, forms an opaque etching ground, upon which a draughtsman skilled with the etching needle can work easily, and thus produce an etched negative. The print obtained from the final result of such a drawing can scarcely be distinguished from an etching produced in the ordinary way. A plate is next prepared with some material sensitive to light—most probably bichromate and gelatine—and exposed under the negative, the light rendering certain parts insoluble. The biting-in, or washing away, whatever the process may be, next follows, which produces a mould from which an electrotype printing block is produced. Of all the processes of this kind in line we have seen attempted, none have been so effective in result as this appears in the hands of Mr. Hancock.

M. CAMARSAC'S ENAMELS.—We recently inspected, at the establishment of M. Silvy, a number of exceedingly charming photographic enamels by M. Camarsac. M. Silvy has just undertaken the general agency for this country for these enamels, and is now prepared to exhibit to photographers these specimens, and also to show them the kind of transparency desirable in order to secure the best results. The negative is not required, but simply a good transparency, delicate, sharp, and full of detail. It is certain, whatever may be the process, that M. Camarsac's long experience and skill in enamelling produce most charming results.

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[*] The number of members in the Royal Academy is forty.

Preservation of National and Local Photographic Portraits.—It is intended, we understand, shortly to open an Exhibition of Photographs at Manchester, in connexion with the collection which Mr. McLachlan recently brought under the attention of our readers. In the proposed exhibition it will be shown what results may be produced from a good transparency, prints of ordinary size on paper, enlargements, plain and coloured, coloured miniatures, enamels, transparencies for the magic lantern, &c. The interest of such an exhibition will, it is hoped, give an impetus to the undertaking, which owes its existence to the energy of Mr. McLachlan. We understand that the Corporation of Manchester, whilst hoping to receive gratuitous presentation of important portraits, are prepared to pay a fair price for such pictures when they cannot be otherwise obtained.

The Cattle Plague and Photography.—We understand that the price of hyposulphite of soda is rising, in consequence of the large consumption as a remedy or preventive in the cattle plague. Iodine is also used to destroy contagion in the same disease, and is, in like manner, increasing in price.

New Use of Photography.—In the case of the skeleton recently discovered near Waterloo Bridge, a set of false teeth would afford, it was hoped by the authorities, some clue to the identity of the body. To this end the Dentological Society had the teeth photographed, with a view to publishing a copy in the Journal of this Society, and thus readily securing identification.

The Magnesium Light.—We understand that some improvements in lamps for burning this wire have been effected in America. Hitherto the lamps have failed because a continuity of the lights could not be guaranteed. This defect originated through the oxide of magnesium (*i.e.*, magnesia) accumulating about the points of combustion, and thus preventing that free rush of oxygen necessary for the conservation of the flame. In the new lamp this accumulation is removed as constantly and as regularly as it is formed. Two moving agents are used · one, hooked like the bill of a bird, and working from right to left, clears off all oxide from the exit tube, while the other acts as a pair of snuffers, and cuts off the pendent oxide.

Employment for Women in Connection with Photography.—Madame Una Howard has been for some time endeavouring to form an institution for teaching ladies in reduced circumstances the art of colouring photographs. The Marquis and Marchioness Townshend and the Countess of Fife recently visited Madame Howard's studio, and became patrons of the institution.

Printing Frame for Opal Glass.—Mr. Willis, of Scarborough, whose printing frame was described in our last, desires us to say that, having had many written enquiries on the subject which he cannot possibly find time to answer, he has sent a pattern frame to Mr. W. W. Rouch, Straud, who will undertake their manufacture.

Palestine Exploring Fund.—Mr. G. Grove publishes a further report from the East, which states:—"Photographs have been taken as follows:—Of the Mosque at Damascus, which, with those taken by Mr. Bedford at the Prince of Wales's visit, will afford a very good illustration of this remarkable edifice; of Bab Shurky; of the city wall opposite Tomb of St. George; of house in the city; of Banias from Wely Khudr; of niches and grotto; of the Fountain-head; and of the Castle from various points.

To Correspondents.

W. Williams.—The shutter used in taking "doubles" is placed from half an inch to an inch in front of the sensitive plate, when a ¼-plate lens is used. The shutters should just meet. With a ½-plate lens, the shutter might be a little further from the sensitive plate.

D. A. (Chard).—Place your background at the south-west end of your room, and get your principal light from the north-west side. The side light should be, if possible, 9 or 10 feet long, and the roof light not much less If it join the side light, extending 5 or 6 feet into the roof will do. It will be well to have top light on each side of the ridge roof. Do not put a window in the north-east end; front light is frequently troublesome. About 18 feet between camera and sitter will answer for most purposes. We regret that we have not time to write private letters on these subjects.

W. Gaiggs.—Thanks. We will communicate with you.

E. T. D. H.—We have not heard any further particulars beyond those which appeared in a paragraph from a correspondent.

W. H. (Bolton).—In speaking of 6 feet over head being opaque, we mean that the roof is opaque for the space of 6 feet from the end, the sitter being placed under such opaque part. The sides may be opaque to the same or a less extent. We should have thought that very good results might be obtained in such a room as you describe, with little or no other alteration beyond placing the sitter with his back to the west, which would lessen the trouble with the sun. Extending your side light will often give you additional facilities in getting good effects, and also decreasing exposure. We prefer a little light on the south side, but the glass should be corrugated, so as to break up direct sunlight. Frames covered with tracing cloth or tissue paper are extremely valuable for windows through which direct sunlight reaches the sitter, sunlight filtered through such blinds being frequently very valuable.

Bodkin.—The precipitation of chloride of silver in washing waters may be slower from the trace of gelatine present when that substance is used in the silver bath; but we do not see that there can be sufficient present to prevent the precipitation altogether. 2. The silver in waste developing solutions will generally precipitate spontaneously in time, especially if any free acid be neutralized. The addition of salt would throw down any remaining portion. 3. Sulphate of iron is best for throwing down the gold from waste toning solutions. 4. A saturated solution of any substance consists in as much as the fluid in which the solution takes place will dissolve.

C. D.—The best remedy will consist in the use of weaker nitric acid, which will give you a more powdery sample of soluble paper, which will be less repellent. The collodion, if iodized with an alkaline iodizer, will gradually get less repellent. Agitating with a trace of carbonate of potash will often prove a remedy. Your solvents are somewhat strong; have you tried an addition of a drop of water to each ounce? It is not necessary to reverse the lens in enlarging.

Tanner.—We prefer A. The direct front character of the light in B would tend to produce flatness.

Palaris.—Magnesium wire is still too expensive to be used for enlargements. If employed, the use of a lamp is simply a matter of convenience. 2. The plane side of the condensing lens is next to the negative. 3. The mirror of a solar camera will not require moving during the few seconds' exposure necessary for a developed print. 4. The mirror moves, by means of a "travelling jacket," round the condenser. 5. If you quite understand the working, and have constructive ability, you may construct a solar camera; but it is scarcely a question which we can answer with certainty. As a rule, we think such things are better and cheaper made by those regularly employed and possessing all appliances than by photographers themselves

W. H. S. (Nottingham).—We think not, except in delicacy, in which it excels. 2. No; not conveniently. It is somewhat uncertain in working. Our numerous engagements do not permit us to answer such questions by private letter.

Stereo.—We fear that your negatives are scarcely up to a commercial standard; but application to a publisher would afford you the best information. The gentleman you mention is a very respectable publisher.

S. S. S. (Alford).—The prints you enclose are very well lighted. As a rule, we prefer a north aspect for the principal light; but in the case you name it would probably be most convenient to have the two lights, east and west, using whichever might be desirable.

Ammonia.—It is only necessary to add nitrate of soda when increasing the bulk of the solution, by adding more water as well as silver. 2. Add an ounce of nitrate of silver for every quire of paper excited, and keep the solution a uniform quantity, adding fresh nitrate of soda, in the original proportion, when water is added. 3. Use the large proportion of nitrate of ammonia.

S. Scott.—No statement of the quantity of liver of sulphur necessary for reducing the sulphur from old hyposulphite solutions can be given, inasmuch as we cannot tell the amount of silver present. Take an ounce of the waste solution and add saturated solution of liver of sulphur, a little at a time, until no further precipitate is caused; let it settle, and test the clear solution again by adding a drop or two more. If this cause no precipitate, try adding a drop or two of silver solution; and if this cause a precipitate, it indicates that excess of the sulphide has been added. By this mode of testing you will gain some idea of the proportion necessary.

A. B.—Thanks; the result is excellent. We believe that the finest deposit is obtained by means of an organic developer. A correspondent, who has examined the deposit obtained by development with a gelatino-iron solution under a microscope, states that it is in much finer particles than that produced by the ordinary iron developer. The latter gives a crystalline, and the former an amorphous deposit.

C. M.—We do not know any one who undertakes the production of microscopic portraits.

Ut Supra.—Benzoin makes an excellent varnish; but it has the disadvantage of softening with heat, and occasionally, when a negative is long exposed to a hot sun, the prints stick to the surface. 2. We do not know of any evil likely to accrue to a negative treated with gum water. Thanks for the prints, which are very excellent. We are obliged by your good opinion.

John Turnley.—It is uncertain whether you can receive the specimens so long after the announcement; but we will enquire. The matter had been overlooked until now.

A B. X.—The prints are brilliant and clean, but a little hard, from under-exposure and over-intensifying.

W. M. C. (Edinburgh).—Mr. Woodbury desires us to state that your communication was received, but the Post Office will not receive letters addressed to initials. Send another address to Mr. Woodbury.

An Old Sub.—Thanks. Let us see the continuation.

An article on Pinholes, by Dr. Vogel, and several other articles in type, in our next.

Several Correspondents in our next.

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ABNORMAL CONDITIONS OF THE NITRATE BATH.—PINHOLES AND INTENSITY.

We call the attention of our readers to an important and interesting communication by Dr. Vogel, which appears in the present number, in which he adds another valuable contribution to our knowledge of the disorders to which the nitrate bath is liable.

Each series of experiments for tracing the cause of pinholes the more surely proves what has long been suspected, that any substance in the solution of nitrate of silver which has a tendency to crystallize out, or to become precipitated, will, at the same time, have a tendency to form pinholes in the negative, by their deposition on the collodion film during the process of sensitizing. Some years ago we proved this in relation to oxalate of silver, by adding oxalic acid to a bath previously made slightly alkaline. We obtained the sandy deposit on the film, and the final pinholes, together with the ready tendency in the image to dissolve in a solution of cyanide, which we had suspected to be due to the presence of oxalic acid in an old bath giving similar results. That the tendency of acetate of silver, when present in excess, is to crystallize out and cause pinholes, is well-known. Two years ago, Dr. Vogel demonstrated that the presence of iodide of silver in such excess that a slight elevation of temperature would precipitate it was a frequent cause of pinholes. All these experiments showed that the presence of an insoluble or slightly soluble salt of silver, ready to precipitate, was the common cause of the evil. The innumerable and infinitely small particles of the precipitate formed on the film as soon as the immersion of the plate caused a disturbance of the equilibrium, and set up action in the bath, may sometimes be seen, the film having a rough surface visible to the eye. These particles protect the sensitive film underneath them from receiving the action of light, and being dissolved off themselves in the fixing bath, leave the well-known minute pinholes underneath.

The causes already mentioned did not seem to account for all the cases in which the presence of pinholes was manifest; and in Dr. Vogel's present communication we have a further cause pointed out, in the presence of sulphate of silver; and we have also the mode in which the sulphuric acid finds its way into the bath indicated. Mr. Mayall, a few days ago, mentioned to us that the examination of the contents of an old bath revealed the unaccountable presence of sulphate of silver. Fortunately the test for this contamination is a very simple one, and by those accustomed to chemical manipulations will be easily carried out. The addition of a very small trace of a five per cent. solution nitrate of baryta patiently watched will, if sulphuric acid, or a salt of it, be present, cause a characteristic white turbidity; although, where a small quantity only is in the bath, a delicate opalescence, rather than a serious turbidity, may be the result.

The singular result of the addition of a trace of nitrate of baryta is very noteworthy. Not only may the obnoxious sulphate be precipitated and filtered out after such addition, but the nitrate bath so treated acquires the property of producing very intense negatives, a condition so desired by many photographers. In this respect the action of nitrate of baryta appears analagous to that of nitrate of potash, which has undoubtedly the effect of increasing intensity. If the nitrate of baryta added for the purpose of precipitating a sulphate be found to produce excess of intensity, the photographer has, of course, a simple remedy in the addition of a little of a new nitrate bath not producing such intensity.

Dr. Vogel cautions photographers against the addition of excess of nitrate of baryta to the bath, as being a somewhat insoluble salt, which might be precipitated by the accumulation of nitrate in the bath, and, by its precipitation, produce the pinholes it had been originally added to remove. Nitrate of baryta is said to be soluble in eight parts of cold water. This is, however, the limit of its solubility, and some samples are less soluble. It is, moreover, very easily precipitated from its solution by alcohol. Although photographers are not likely readily to add sufficient to oversaturate the bath, it is well to keep very far on the safe side, especially if the free addition would tend to produce offensive hardness in the negative.

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Critical Notices.

THE PHOTOGRAPHIC SOCIETY AND ITS ORGAN.

By C. Russell. Price Threepence (!). (London: Diprose and Bateman.)

With considerable reluctance we once more allude to a matter which has been discussed *usque ad nauseam* in other pages. We feel that, at the outset, we owe an apology to our readers for intruding the subject on their attention. Our sole object is, however, to correct mis-statements which, if permitted to pass unchallenged, might afterwards be regarded as admitted facts. We shall not attempt to follow Major Russell through his narrative, consisting chiefly of his own letters and garbled extracts from published matter; warped and untrue as many parts of it are, we are quite satisfied to let readers form their own judgment thereon. We content ourselves with correcting a few distinct misstatements concerning others as well as ourselves.

Referring to a letter we addressed to the *Photographic Journal* in August, Major Russell says:—"I understand from this letter that Mr. Simpson confesses that he knew that I practised my method of development before the publication of Mr. Leahy's." Those who will take the trouble to refer to that letter, page 136, *Photographic Journal*, August 15th, 1865, will find that we said just the opposite. In answer to a similar statement as to our knowledge of Major Russell's use of the alkaline development, the letter says:—"I did not know it; I had no means of knowing it." In a private letter we wrote to Major Russell about the same time, in answer to one of his, the following passage occurs:—"You have repeated a mis-statement several times on one point. I *did not know* that you had used ammonia development prior to Mr. Leahy. The first I ever heard of it was from Mr. Leahy, in October, 1862." Despite these corrections, he goes on repeating the same blunder, and re-asserting that we have admitted its correctness. Again, he remarks:—"Mr. Simpson says he did not *directly* suggest the article;* is it too much to infer that he *indirectly* suggested it?" We have given Major Russell the most unreserved denial—public and private—of our having *directly or indirectly* suggested or written the article in question, and the editor of the *Photographic Journal* has done the same, and distinctly avowed his sole responsibility for it; but the Major repeats his insinuations as though they had not been effectually answered. We may further add, that we do not know what may be the practice of Major Russell in making statements with mental reservations, but we regard the "paltering in a double sense," in which he courteously conceives we may have indulged, as the worst kind of lying.

We have alluded to a private correspondence.

It is necessary here to explain that we were, during last summer, drawn into a bootless correspondence with Major Russell, for which we had little time and less inclination. In the frankness of a private correspondence, we explained to the Major, in answer to certain questions, that it was the common talk of many members, at the conclusion of the meeting of the Society last May, that he had read an egotistical and ungenerous paper, in which no allusion of any kind was made to the labours of independent and prior discoverers in the especial branches of the art discussed. Because we told him that we had heard such conversation, he has since jumped to the conclusion that the obnoxious article was the producton of a "conclave," of which we formed part! This is, of course, just as false, so far as we are concerned, as his direct charges.

In concluding our correspondence with the Major, we felt it necessary to impose certain conditions upon a correspondent whose ideas of honour scarcely inspired us with confidence; we said, therefore, "You are quite at liberty to publish any portions of my letters, *but it must be done in my own words, and always in connection with the full context*, as, without doubting your honesty, I cannot trust your freedom from prejudice in construing them after your own manner." After this injunction we might fairly have expected that any argument to be derived from these letters would have been given in our own words; but nothing of the sort is done. Major Russell says he "deduces" so and so from the letters, and concludes by remarking, "Were I to use some things in Mr. Simpson's letters, I could prove more against him"! It is true that he has proved nothing at all beyond his own wrongheaded persistence in a foregone conclusion. His charge against us—namely, that we wrote a certain article in another journal—in no wise dishonours us, if true; and we personally have no reason for denying the charge, beyond its untruth. But the publication of insinuations which, being undefined, cannot be answered or disproved, is generally regarded as a depth of meanness to which any one with pretensions to the character of a gentleman could not stoop. The whole matter is almost too contemptible for serious indignation; but we are bound to repel the insinuation as false and calumnious.

We have simply to add, in conclusion, that all his conjectures about cliques and this Journal are wild fancies without any foundation in fact. We belong to no clique, and this Journal represents no clique. It is, and ever has been, strictly independent, devoted not to the interests of person or party, but to those of photographers at large. It is with considerable reluctance that we even defend ourselves from personal attack; and we promise our readers that, without urgent necessity, we shall not mention the name of Major Russell again in our pages.

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Stray Papers on Photography.

No. 2.—ON THE GRADATION OF PHOTOGRAPHS—(*continued*).

BY NELSON K. CHERRILL.

I NEED hardly occupy space in attempting to prove that the gradations representing any one set of colours are, in a photograph, much more delicate than any engraving can be made. The extreme minuteness of the points forming the gradations of a photograph is, or rather should be, the measure of the delicacy of the gradations which may be produced.

It is quite clear that if we took a photograph of a subject gradated in one colour—that is, from white (into which all colours resolve when sufficiently dilute) to the darkest tone of any colour in the spectrum—it must be correct as far as it goes; the most brilliant portion will be first impressed; but if the exposure be not continued for a sufficient length of time, the details in the shadows will not "come out." But, from the very nature of the case, I maintain that the density or intensity of whatever detail does "come out" in the development will bear exactly the same relation to that of the highest light as it would do in the perfect picture; so that if, in the object, any point of detail is twenty times darker than the highest light, its impression in the photograph will be twenty times darker than the impression of the high light, whether the high light is as dense, or only half as dense, as it ought to be.

From this we see that the test for exposure will be the rendering of the deepest point in shadow; and that a prolonged exposure would have the effect of raising the whole series of tones in the picture to a greater or less proximity to the tone of the high lights; because, after a certain elevation in the range of tone, the high lights must stop at white, which is the highest tone that can be obtained on paper.

Again, suppose that we photograph another object, gradated in two colours of the spectrum—that is, from white to (say) red and blue; it follows, from what I have just remarked, that if we expose and develop a plate in such a manner as to obtain one of these series of colours with the greatest perfection, we shall be at fault somewhere in the other series.

From these considerations we may, I think, deduce two general propositions of some moment.

1st. That in making a picture by photography, the colours of those parts of the original which require the most perfect gradation should be as nearly as possible of the same relative actinic powers.

2nd. That the greater the number of tints in any photograph, the more nearly it may be made to represent any one or more series of colours.

The second of these propositions will now demand a few remarks.

I have, in another paper, mentioned that the more slowly the deposit of silver is formed on the plate, the more perfect will be the arrangement of the molecules; and therefore, of necessity, the silver image will more exactly conform to the chemical condition of the plate after exposure.*

I have also pointed out that the more slowly the silver deposit is formed, the finer will be the grains or molecules of which it will be formed, and, in consequence, the greater will be the so-called "density" of the image.

From this we shall see that the best possible conditions for rendering the gradations of any subject by photography will be those which, by giving density in the negative, will require "sunlight" printing. That this condition is the one best suited for the production of proofs by the albumenized paper process is, I believe, confirmed by the practice of many, if not all, of our best photographers.

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* That in the *Photographic Journal* of May 15th, which offended the Major's *amour propre*.

* It is hardly necessary to enter into any explanation of this remark; but there can be no doubt but that in many instances the image formed by the developer is by no means so perfect as the chemical impression.

I mentioned in my last that the best form of developer was that which gave full intensity at once, and that double printing would be found enough to meet most of the requirements of the photographer, as far as the gradations of his pictures are concerned. To these conditions I must now add that the developer work slowly, and that the proofs be taken in sunlight, of which last remark more in my next.

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ON A NEW CAUSE OF PINHOLES AND STREAKS, AND ON THE ACTION OF NITRATE OF BARYTA IN THE NEGATIVE BATH.

BY DR. H. VOGEL.

Among the many defects in the negative process, none is so frequent as pinholes in the collodion film. Every photographer is familiar with these troublesome spots, which are most prone to make their appearance in the case of old silver baths, and the chief cause of which, apart from dust, is the iodide of silver dissolved in the bath, which finally (when the bath is saturated with it) tends to crystallize in combination with nitrate of silver, adheres to the collodion film whilst in the bath and during the development, and finally leaves behind a small hole, at first scarcely visible, but coming out more clearly by contrast when the print is strengthened.

Two years ago we devoted special attention to these precipitates of iodide of silver, and made several remarkable observations, which threw light upon the action, hitherto in so many particulars obscure, of old silver baths.

We showed at that time that iodide of silver is less easily soluble in heat than in cold, and that, therefore, on hot days silver baths soon become turbid, and grow clear again by simple cooling. We also showed that iodide of silver is more easily soluble in acid and alcoholic baths than in those containing only pure water and the silver salt.

Hence was easily explained the formation of pinholes in the heat of summer, or after the neutralizing of the bath; and our friend Mr. Wharton Simpson showed the correctness of our results in a series of comparative experiments.

Singular phenomena still, however, presented themselves, which could not be harmonized with this theory of the formation of pinholes.

Herr Kurths, of Magdeburg, wrote to us, that at a low temperature (4°) he had found pinholes, which on warming the bath to 12° disappeared. A similar announcement was made to us by Dr. Lorent, of Maimheim.

The combination of iodide and nitrate of silver could not be the sole cause of these phenomena, for at a low temperature it not only does not precipitate itself, but even dissolves, as may easily be observed on the cooling of a bath that has become turbid in the heat.

We sought the further cause of the defect in other salts scarcely soluble, which dissolve less readily in cold than in heat, and must therefore precipitate themselves on cooling; the acetate of silver, for example, which originates so easily in the bath through the adding of acetic acid, or through the decomposition of the alcohol contained in it.

Of course such a secretion of crystals of acetate of silver on the collodion film has been repeatedly observed by us and others. These, however, occasion not so much pinholes, as "spears, crosses, and swords," the needle-shaped crystals attaching themselves to the film either singly or with several crossed together, and hindering the action of the light.

Our attention was lately directed once more to this point by a letter from Herr Krüger, of Schwerin. He sent two samples of crystals which had precipitated themselves in his silver bath, and wrote that he had been annoyed the whole summer by pinholes, which often appeared after two days' use of a new silver bath, even when it contained little iodide of silver. The crystals in question had secreted themselves on the evaporation of one of the baths.

I examined the crystals, and found, besides iron and a few splinters of glass, a considerable quantity of sulphate of silver.* This result surprised me, as I did not at once suspect the source of this impurity. A second letter from Herr Krüger gave the necessary explanation, informing me that in the examination of the spoiled baths he had likewise discovered sulphuric acid, and that this arose from the *impure iodizers* which he had applied. At the same time he sent me the iodizers mentioned, and the impure bath, and there I found indeed sulphuric acid along with carbonic acid (in the iodizer).

The source of the sulphuric acid in the bath was now discovered. A part had got in the bath at first by iodizing it with a little iodide of potassium. Every new collodion plate had increased the quantity of it, and the most probable supposition was, that the salt, with its known difficulty of solution, had rapidly precipitated itself, and occasioned the pinholes.

In order to test whether the sulphate of silver really occasioned pinholes I made a silver bath 1·10, and mixed this with ¼ per cent. of iodide of potassium, and tested it. There were *no pinholes.*

To 200 cubic centimeters of the bath were now added 0.8 grain of sulphate of soda. A considerable precipitate of sulphate of silver was formed. This was filtered, and in the filtered bath a plate was made. On sensitizing, it appeared covered with small crystals, and after being exposed to the light and developed, it swarmed with little pinholes.

Here, however, a considerable quantity of silver (about 4 per cent.) had been precipitated as sulphate, and there was reason to suspect that thereby the power of solution for iodide of silver might have been lessened, and thus the pinholes caused. I therefore repeated the experiment, taking 200 cubic centimeters of a new freshly iodized bath, and shaking it with fixed sulphate of silver. Here the quantity of nitrate of silver remained the same.

Only very little sulphate of silver was dissolved, and I obtained a bath which contained of sulphuric acid much less than that of Krüger, and also gave but few pinholes. During the night, however, the bath cooled considerably, and next morning it gave numerous pinholes.

The cause, however, might still be laid on the iodide of silver which was present. I therefore made a third bath without iodide of silver—200 cubic cent. of water, 20 grains of nitrate of silver, and 0·5 grain of sulphate of soda; a precipitate of sulphate of silver was thereby formed. The whole was now heated to 90° C. Notwithstanding this, the precipitate dissolved with extreme slowness, and even after an hour-and-a-half there was still a small residuum—a proof that 100 cubic cent. of a silver bath 1·10 at 90° C. is hardly capable of dissolving ¼ grain of sulphate of silver. A further addition of 0·5 grain of sulphate of soda was made, the evaporated water replaced, the whole filtered, and allowed to cool for twelve hours. Small crystals had then secreted themselves on the surface. Several prints made in this bath showed very numerous pinholes. Now this bath was free from iodide of silver, apart from the small quantity which is dissolved in sensitizing; the pinholes accordingly could *not* proceed from it. It is therefore established beyond all doubt that pinholes are occasioned by sulphate of silver.

I observed, moreover, in the case of this bath, another remarkable phenomenon, viz., clear, worm-shaped lines. These lines reminded me strongly of an incident which occurred in the Photographic Association. Herr Benque exhibited at the session of the 17th of March several prints, upon which quite similar lines were visible. Nobody was able at that time to give a satisfactory explanation of the phenomenon; Herr Schippang and Herr Prümm ascribed it to the iodizers.

I believe that I can now, with tolerable certainty, assign as the cause of these strange phenomena the presence of sulphate of silver, and it may be that this has been produced by the impure iodizers. The matter induced me to examine several of the commercial samples of iodizers, and I readily found in these sulphuric acid and carbonic acid.

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* Mr. Mayall recently mentioned to us that, as the result of the examination of an old and imperfect bath, sulphate of silver was found in it.—Ed.

There are, besides, other sources of sulphuric acid in photographic baths. It may proceed (2) from impure nitric acid, which was employed in the dissolving of the silver (as Herr Krüger has already asserted); (3) from acid pyroxyline; and (4) from impure blotting paper. The latter not seldom contains sulphate of lime, and also sulphate of soda, as a residuum from the bleaching process with antichlor.

It is obvious, therefore, that the presence of sulphuric acid in photographic chemicals is much more frequent than one would suppose, and it appears to me highly probable that the formation of pinholes in cold weather (as observed by Herr Kurths and Dr. Lorent) proceeds from it.

These experiences may induce manufacturers to direct their attention to this, hitherto entirely overlooked, the presence of sulphuric acid in photographic chemicals; and we advise photographers to test their chemicals themselves for it.

This is best done with the aid of nitrate of baryta, which is to be added to a solution of the substance to be tested, acidified with a few drops of nitric acid. The presence of sulphuric acid betrays itself by producing a turbidity. To test, in this way, silver baths containing iodide of silver in order to detect sulphuric acid, requires caution, since iodide of silver precipitates itself, and likewise occasions turbidity; two or three drops of nitric acid should be added to four cubic cent. of bath solution, in order to prevent the precipitation of iodide of silver, and not till then a few drops (as few as possible) of nitrate of baryta solution. The turbidity does not show itself for some time. It is better, however, to precipitate the silver with pure hydrochloric acid, to filter, and then to test for sulphuric acid.

Now I tried, by mixing with nitrate of baryta, to precipitate the sulphuric acid in the negative baths which contained the latter, and which produced pinholes. In connection with this, I made a remarkable observation.

I added 0·8 solid nitrate of baryta to the first bath (200 cub. cent.), shook it, and let it stand till the next day; then filtered off the sulphate of baryta which had been produced, and made a print in the bath. This showed now no pinholes, but an *astonishing intensity* immediately after development, so that it could be printed immediately without any strengthening. The plate appeared only a little hard.

The bath contained, as I establish by examination, a little barium.

The second bath, containing sulphuric acid (it contained 0·25 per cent. sulphate of silver), was now mixed with ½ per cent. nitrate of baryta, and treated just as above.

The result was the same. I obtained a plate of *extraordinary intensity*, somewhat hard in the lights, but with many fine details in the shades (of the original), finer than with an ordinary bath. The intensity of the plates made in the second bath surpassed that of those made in the first (which also contained less barium).

I must conclude from these experiments, several times repeated, that nitrate of baryta in the negative bath increases remarkably the intensity of the plates.

It should only be added, however, in a very small proportion to the silver bath, for it belongs to the salts which are difficult of solution in water, and which are precipitated in crystals by alcohol.

If a bath, therefore, contains much barium, the latter is precipitated by the alcohol of the collodion film, and occasions, like all precipitates of that kind, *pinholes*. With longer use of a bath containing much barium, these pinholes would appear to a remarkable extent.

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IS PURE IODIDE OF SILVER SENSITIVE TO LIGHT?—A REPLY.

BY DR. VOGEL.

In a recent communication, our friend Mr. Lea proves, in a convincing manner, the sensitiveness of *pure* iodide of silver to light. We willingly admit the force of his demonstration, but find ourselves compelled to protest against the remarks on our theory which he appends. He says[*]:—

"Dr. Vogel's theory may be briefly stated as follows:—

"1st.—Pure iodide of silver, isolated, is insensitive to light; it is never sensitive unless there is some substance present capable of combining with iodine.

"2nd.—When nitrate of silver is present in excess, it is capable of taking up the iodine liberated by the action of the sunlight. This free nitrate may be replaced by substances capable of combining with iodine—as tannin in its various forms, chloride of tin, and many other substances. There presents itself at once a most formidable objection to this theory, that it assumes a fact, and then reasons on that assumption. It assumes that iodide of silver, when pure, is insensitive, and then explains why certain substances impart to it a sensitiveness. But I deny the original assumption—that pure iodide of silver is insensitive. I affirm that it is sensitive, and offer incontrovertible proofs thereof; and, when I examine the argument on the other side, I cannot find that any experimental proof is offered for this alleged insensibility. It seems to be taken in the face of the clearest facts. If it were said that iodide of silver was moderately sensitive, and that these substances acted as accelerators, the position would be more tenable; but it appears that the positive incapacity of pure iodide of silver to receive a latent image, when alone, is the base of the theory, and it must stand or fall with it."

In reference to this, we observe that our theory *does not at all rest* upon the assumption of the insensitiveness of iodide of silver to light, but upon the *actual observation* that all bodies examined by us which absorb iodine chemically—as salt of tin, arseniate of soda, salts of silver, &c.—promote very energetically the action of light upon iodide of silver. From this we drew the conclusion that those bodies which easily absorb free iodine, and combine with it chemically, have a sensitizing effect on iodide of silver.

This sentence, and *only* this, is the essence of our theory. All that we said of pure iodide of silver was: "Pure iodide of silver is *probably* not in general capable of decomposition in the light." Accordingly, Lea's supposition that our theory is based on the affirmed insensitiveness to light of pure iodide of silver rests on a "most formidable" error. Our theory, therefore, does not stand or fall with this assumption, but stands firm, so long as the *fact* is not disproved that the sensitiveness of iodide of silver to light is increased to the greatest degree of intensity by bodies which are absorbing iodine, or until it is established that the effect of these bodies depends on something quite different.

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THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Introductory Remarks.

"Divide and conquer!" (said Dr. Johnson) "is a principle equally just in science as in policy. Complication is a species of confederacy which, while it continues united, bids defiance to the most vigorous and active intellect, but of which every member is separately weak, and which may, therefore, be quickly subdued if it can be broken."

"Divide and conquer!" should be the motto practically adopted by every photographer who aims at something higher than a mere superficial knowledge of the chemistry of his art, as it is by a divided scrutiny only he can succeed in securing appreciative ideas of the action and reaction that occur, or from which he can expect to realize mentally effects and causes that no written language can ever clearly explain or describe.

An attempt to secure at a single grasp a knowledge of guiding principles which pertain to photographic phenomena must assuredly prove a miserable failure; but by dividing piecemeal the substances employed, and studying each individually, the task under such conditions becomes an easy one, for the chief rule that should guide attempts at self-instruction is to advance by short stages, ever making sure that our position is secure ere we move another step.

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[*] *British Journal of Photography*, February 2nd.

To preserve the integrity of my plan it is necessary that I first submit solar light to a threefold division, in order to show the connecting working partnership existing between the phenomena of reflection, refraction, and actinism, which are identical in importance, which prevents either from receiving a preferential consideration.

They are reflected rays which sparkle upon the crested waters, or impart to a sun-lit landscape the indescribable charm of colour; arraying in robes of beauty the highest lights, or pencilling detail in the graver shadows; in short, no object becomes visible except by the reflected light from its surface reaching the eye.

As a familiar illustration of the three-fold division referred to, I may compare a ray of light to an exceedingly fine thread, consisting of three strands, whose varied hues might be severally described as red, the heat-giving ray; yellow, the source of light; and blue, that yields chemical power.

Having already shown that objects become visible only through the agency of reflection, and that an apparent body is in reality its fac-simile painted on the retina of the eye, attention may be directed to the admirable natural arrangement by which actinism is guided when engaged in tracing on a sensitive surface an accurate transcript of the evanescent reflected sketches.

If the varied coloured rays that pass through a lens into the camera each possessed actinic power in like amount of intensity, no picture could, under such conditions, be made permanent as results such as obtained by exposing a sensitive plate to open daylight would be produced; but happily its powers are curtailed, and "fitness" secured by its proportionate activity being guided by the quality of light, and the influence of colour. Instance, a white material which possesses only in a trifling degree the capacity for absorption, the chemical ray is returned to exert its entire strength on the sensitive medium that rapidly yields to the decomposing agent. A blue colour would behave in a similar manner, because the power represents the hue when light is analysed by the prism, or, what might prove more intelligible from the colour last named, the power is emitted; but with the yellow and black tints the subject assumes another aspect, as in both cases the chemical rays are by them absorbed, although sufficient white light (more especially from the more prominent portions of the object) is reflected to convey texture and detail to the silvered plate, a familiar example of which is seen in photographing black velvet or yellow drapery.

The gradations of greens are more easily secured, because such tints are in advance of yellow or black, by reason of the smaller amount of actinic force, the former cut off by absorption, they being formed of blended blue and yellow pencils, while the reds offer no difficulty to the photographer by reason of its surface, that reflects a considerable amount of white light, varying, of course, with the circumstances under which reflected rays from the object are conveyed.

Without going into the conflicting theories by which elucidations of a perplexing subject have been attempted, I merely repeat the statements concerning an ascertained fact, viz., colours owe their existence to an inherent property held by ponderable matter, by which light is decomposed, and the coloured rays divided, reflected in part, the rest absorbed. Thus to nature is given the invaluable charm imparted by a myriad varied hues; and although such lovely colours cannot be reproduced in the camera, still no reflective mind can pass unheeded the link working within link to produce a perfect whole, reflection bearing on its wings a picture which is traced by refraction on the ground glass, finally to be entrapped by the assistance of an agent whose services are most actively engaged where high lights are required, then gently decreasing its efforts while moving through the softly receding shades, until it stays its work just where deepest shadows should remain untouched.

The chain of evidence might be continued through the various operations by which a picture is produced; but as the foregoing remarks are intended as introductions to a series of others bearing on the Photographic Reason Why, I shall have occasion to trace a sun picture through each stage of its existence, with an exposition of the chemical principles concerned in the production. It will, at the same time, be my endeavour to show, as I proceed, that photographic operations throughout form a beautiful chain of evidence to prove the "dovetailing fitness" by which nature links her work together.

In concluding the present paper, I would just observe (it being my sincere desire to make the proposed series of articles as useful as possible), I shall be happy to receive suggestions and apply them when practicable; and that in addition to this, where information is needed that might prove of general interest, I shall gladly receive the query through the office of the News. In short, I willingly invite information or corrections, but in no instance can controversies on unimportant matters be entered into. My sole aim being to benefit the votaries of our art, I have neither time nor inclination to engage in petty or personal discussions. My aim will be to write for, not at, my readers; yet it sometimes happens, that

"Many a shaft, at random sent,
Finds mark the archer little meant.'

To this quotation I would add, in other measure,

If, reader, any shaft of mine hits you,
'Twas not so aimed, but perhaps it struck where due.

PHOTOGRAPHY IN THE ZOOLOGICAL GARDENS.

BY FRANK HAES.*

My Horses, already mentioned, come next.

Some fine specimens of Spanish Donkeys, which were in the Gardens, waiting shipment to Queensland, follow. Of these the male stood fifteen hands and one-third, the female fourteen and a half. These, landed here, are worth a hundred pounds each. I had no particular trouble with them. Mr. Buckland, who shipped them, has allowed me to include them in my series.

The Syrian and African Wild Asses are the next. From the latter it would appear that all the donkeys common to this country are descended, as this is the only variety that has the cross on the back.

The common Zebra, of which the Society has not possessed a specimen for nearly twenty years, is No. 29 of this series. This was not a full grown animal, and was sickly; it is since dead. I have, however, two negatives of it, and had not more than the average amount of trouble. No doubt it is well known to all here that last year a young Zebra was born in the Gardens; the father being the one which Rarey said he had tamed; but the Society's keepers say that all the taming in this case was produced by starvation, and that he was in very poor condition when returned.

I was very anxious to get a photograph of the mother and foal inside the paddock. At the commencement of the work, the mother—startled, of course, by the camera—rushed open-mouthed at my assistant, and almost knocked him down. I, however, attracted her attention by running up and waving the focussing cloth before her; in this case I received great assistance from the keeper, and at last obtained three negatives, the worst of which is now in your hands, having unfortunately broken one half of the one intended for the stereoscope in revarnishing the negative; I, however, can show you a print of the other half. The finest negative is one in which the mother is suckling her foal. I may here mention that I have not the pleasure of showing you prints from the best negatives I obtained last season, as in every case I have reserved them for producing magic lantern slides, unless accidents happen to those already in use.

Having, the year before last, photographed the large female elephant, I last year tried Master Peter, the young male

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* Concluded from p. 79.

Indian elephant. I may repeat, that all elephants are very fidgetty animals, and Peter gave me the usual trouble.

The Society having made a valuable addition to their collection by exchanging a young rhinoceros with the *Jardin des Plantes* for a young African elephant—the first living one seen in England—soon after his arrival, and improvement in condition, I attended to photograph him. He is an amusing fellow, and I saw him tease the old hippopotamus in grand style. He kept striking Obasch with his trunk on his mouth, and, of course, enraged him terribly. The hippopotamus rushed at the rails open-mouthed, trying to catch Jumbo's trunk, in which he was frustrated by the adroitness of the animal; and when the elephant was satisfied with irritating him, watching his opportunity, he turned round, and with his hind foot flung a lot of gravel into the hippopotamus's open jaws. Allow me to call your attention to the great difference between the Indian and African elephants. No part of the body is alike; but the greatest dissimilarity is in the trunk. In the African variety this appears far more flexible, and is quite devoid of the finger of the Indian elephant; indeed, the opening of the trunk of the former is exactly like a snake's mouth. The Society has lately acquired a very young female African elephant, not higher than a table.

The young male Rhinoceros arrived with two others in 1864. One of these I have already alluded to; one went to Dublin; and of the third you have a portrait. I can only say of him that he is a real chip of the old block.

I may be asked what has the next on the list to do amongst these large animals—a small fur-coated creature, much like a rabbit? All I can reply is, that this, the Hyrax, is the connecting link between the rhinoceros and the hippopotamus, and, strange as it appears from its external form, is a true pachyderm; the Syrian variety is the coney of the Bible. This little animal is very short-tempered, and although easily put in the cage, yet the keeper warned me not to trust my hands within reach of its mouth, as its teeth were like chisels. Hardly had he cautioned me, when, through some movement he made, the hyrax bit him, and made the blood flow profusely from his fingers; unfortunately, practically illustrating the power of its armed jaws. By carefully watching, I secured two negatives.

Next come our large old friends of the first series, the Hippopotami. I was not satisfied with the negative of that series, but was baffled in all my endeavours to do better in 1864, and I could not accomplish this without going inside the enclosure. This was a matter to be well considered, because things must be so arranged that we could beat a speedy retreat if necessary, and yet not allow our fat friends to come out. Again taking counsel with the keepers, we managed to provide for all contingencies, and the poor hippopotami had to submit to having their portraits taken. To this there seems to be some decided objection in the hippopotamic brain, almost as great as the unwillingness of thieves to allow their likenesses to grace the Prison Album. You will notice that the back of the animal is little better than white; this is caused by the great reflection from the oil which exudes from glands covering the whole of the body; and as regards the light, there is no other position in which it is possible to get a photograph. I also succeeded in getting a good portrait of the female, who is, if anything, worse tempered than her companion, over whom she tyrannizes without remorse. It is amusing to see the great dread these unwieldy creatures have of a few drops of rain; the slightest shower falling on them from a passing cloud, when they are basking in the sun, will rouse them up, and send them, not into their house, but to the bottom of the tank, for shelter.

These and many other animals seem to have a great aversion to seeing people dressed in working clothes or without coats, and it is not necessary to do more than allude to the very unpleasant way in which they manifest their dislikes.

My next subject is a new variety of Armadillo, having only three bands. This is not so strictly nocturnal as most of the family. As you see, it can, when alarmed, roll itself up into a perfect ball, in which form it is difficult to distinguish the head from the tail. The Weasel-headed Armadillo is a better known specimen of the class. The only difficulty in photographing these was to keep them on the chair, as they continually jumped off.

Nos. 38 and 39 are mother and young of the Two-toed Sloth. It is to be noticed that I have always found these and other sluggish animals very difficult to photograph; they keep moving some portion of the body, not fast, but yet they are very seldom quiet, so several plates were spoiled before succeeding.

The Condor Vultures look very much like the conventional eagle we see on the stage. The white brick arch at the back prevents the heads showing to advantage. Several attempts were made with the other vultures before any negatives worth preserving were secured.

The Crowned Harpy Eagle is a magnificent bird, of which the photograph conveys but a poor idea. This and the Sea Eagle were difficult to take, because when, after watching patiently, the bird was in a favourable position, and everything ready, it would turn round and look in the camera. No doubt you have noticed how these birds can, when their back is towards you, turn round their heads and look you full in the face.

The specimen of the Hornbill is new to this country. The plumage is handsome, and it is a bold bird, for when entering its cage, it did its best to peck at me. It gave a good deal of trouble, flying about and shifting on its perch.

I could not get the Rhea to be quiet when inside the enclosure, so went out; but the close netting quite spoils the picture.

Of the next, which is the Kiwi of New Zealand, I am afraid you will say that the keeper is all that can be seen. This is a truly nocturnal bird, and after trying all sorts of ways, I could only get anything by having the bird held in the keeper's hands, which of course hides the strong legs and claws of this remarkable wingless bird. On the ground is the egg, which is a fourth of the weight of the bird. The long narrow beak is also plainly seen.

The Marabou Stork is one of the birds which furnishes the beautiful feathers worn by ladies on State occasions. Introducing the camera into the paddock gave great offence to the female, which flew screaming over the railings; and the one I photographed would not allow me to come nearer than the distance at which the stereogram was taken.

The Pelicans gave no more than the usual amount of trouble, after once the desired bird had been separated from its fellows.

I now come to the Reptiles, of which hitherto my experience had been limited to the Tortoise. The first of these, the Australian Monitor, is known in the Colony as the Iguana. They are plentiful in the interior, and are constantly seen in hollow trees or running on the ground. They are very active, catching young birds and other small animals. It was necessary to hold our friend by his tail, so that he should not run away before leaving his portrait. The Teguexin Lizard was not very troublesome; and the same may be said of the handsome Cyclodus.

I have now come to the Snakes; and here it is hardly necessary to mention that all whose portraits you see are of the non-venomous kind; indeed, they are all members of one family, of which the Boa Constrictor is the type. Some of these snakes were very lively and active when removed to the open air, owing to the genial warmth of the sun; and one great advantage I enjoyed when engaged with the reptiles was, that not many persons cared to remain very near us when they once saw what kind of animals we were photographing. I must here combat the poetical description of the Slimy Snake, for they are quite firm to the touch, and to my fancy much nicer to handle than fish. Like most persons, I had a sort of dread of touching snakes, but when once done, I soon conquered the repulsive feeling; they are very heavy for their size. The handsome Diamond Snake, of New South Wales, which is about seven feet long, is so named from the diamond spots on the skin. In the slide before you, the head is the lowest part, and is partially obscured by the shadow of the trestle; but in the stereoscope it has a good effect. The Rock Snake of India, a fine, lively, and vicious specimen, is about ten feet long; it was so vicious that the keeper was obliged, as you see, to hold its head, and it bit him before we had finished. In the next, the African Python, a young specimen, about seven feet long, you see a curious knot, in which the snake tied itself, and which so struck me, that having a plate just ready, I requested the keeper to try and bear the pressure whilst I photographed it. I allowed the python to coil itself round my arm, as I wished to have an idea of the constricting power of these reptiles. The feeling was as though some gradual and almost irresistible power were closing round, and rendering the arm powerless, which was not lost on the removal of the snake. These creatures are infested with a parasite which hides under the scales, and lives on the blood The beautiful markings of the skin are plainly seen in the photograph.

The Boa Constrictor, of which you have before you four portraits, was not in good health at the time; it is since dead. It measured about thirteen feet in length, and in the thickest part girthed nearly eighteen inches. The Yellow Snake of Jamaica was an active fellow, and looks in the photograph spiteful enough. A great deal of the unpleasantness associated with snakes—independently, of course, of the deadly poison carried by so many—seems to me to result from the want of eyelids, which is a distinguishing mark of true snakes, and which causes a feeling of dislike not easy to overcome.

The last but one of this series is the American Bull Frog, which did not fancy being placed in the hot sun on a warm stone, and accordingly kept hopping off, to my annoyance, until I poured water over him and the stone, and so kept him at a temperature that made him more complaisant.

Our pretty English toad, the Natterjack, concludes my second series of zoological stereograms. Besides these shown to night, I repeated many of the subjects of the first series with varied success, failing with the large carnivora, but getting better negatives of many of the other animals.

I cannot help feeling the egotistical character of this paper, and trust you will pardon it. I have not been able to add anything to our previous knowledge of photography, but have simply tried to present to the public something more trustworthy and reliable than the pictures usually seen of animals: you and they must be the best judges of how far I have succeeded. For this reason I still keep to stereograms, as nothing else gives such a correct idea of the forms of animals.

I beg to thank you, gentlemen, for the kind attention accorded to me, and shall be happy to reply to any questions.

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NEW EXPERIMENTS UPON THE LATENT IMAGE.

BY M. CAREY LEA.*

The singular experiments which form the subject of the present paper might, if I were disposed, be adduced in support of the theory which I have always advocated, of the physical nature of the latent image. But I hold that the first object of every investigator should be simply truth, and that he who makes this secondary to the support of individual views is unworthy to enter into the field of scientific research. And upon mature consideration, it appears to me that these phenomena are as easy to explain—or rather as difficult to explain—upon the one view as upon the other. But I do not wish to be misunderstood: if these results seem at first sight opposed to the physical theory, they certainly militate at least as strongly against the chemical. Indeed, except under a view which I shall presently advance, they would seem to finally dispose of all existing theories, chemical and physical.

An important portion of these experiments was performed and communicated to me by my friend, Mr. Thomas P. Shepard, though it has been not without difficulty that I have prevailed upon him to allow me to mention his name in connection with them. Those which originated with him I have carefully repeated with concordant results, and can bear testimony to the exactitude and nicety of his work.

In a preceding paper I showed that when an image has been developed upon an ordinary film of mixed iodide and bromide of silver, it can be completely dissolved off by means of acid pernitrate of mercury, and then will be reproduced by a second development. This curious fact receives a remarkable extension from the two following experiments:—

Experiment 1.

A collodion film containing an iodide and a bromide was sensitized and exposed in the ordinary manner. It was then plunged into a hyposulphite bath precisely in the condition in which it came from the dark slide, except that it was washed first under a tap. The plate was left in the hyposulphite bath, not merely long enough to remove the iodide and bromide and clear the film, but for five times the time necessary for that purpose.

When taken out from the hyposulphite bath, the plate had the appearance of a piece of clear glass, with no trace of a picture, no vestige of iodide or bromide. On the application of an iron developer with silver, a distinct image appeared.†

Experiment 2.

A similar plate was sensitized and exposed as before The plate was next washed, and, as before, without development, was plunged into an acid solution of pernitrate of mercury, made tolerably strong. A very weak solution of acid nitrate of mercury will dissolve a developed image, and leave the iodide and bromide but little affected in the time requisite for dissolving the image. But with a stronger solution and a more continued action, the iodide and bromide themselves disappear.

The undeveloped plate was then left in this stronger solution until every trace of iodide and bromide was removed. It was then well washed, and the collo-developer was applied. A distinct image was forced out.

[To those who may be disposed to repeat this experiment, I would remark that a certain amount of care is necessary for success. The solution of mercury must be in a proper condition, and the washing must be thorough. I have succeeded best in the following manner:—

Take commercial acid pernitrate of mercury, and dilute it with about five times its bulk of water. Add to this a weak solution of caustic soda, until it is completely neutralized, which will be indicated by the production of a slight precipitate which does not redissolve. Filter and acidulate with a few drops of nitric acid.

The washing should last for half an hour under a tap. The first affusion of water clouds the clear transparent film by precipitating a basic nitrate of mercury, which, by prolonged washing, dissolves out. Even, however, where the mercury was not absolutely removed—that is, when the washing was shorter—I have succeeded in developing an image, though I do not recommend any but a most thorough washing, without which the experiment will mostly fail.]

It is not to be imagined that the image thus obtained is a shadowy thing, leaving the observer in doubt as to whether or not it is there. The image is at first faint, but regularly strengthens; the plate is apt to be foggy in spots, but not all over. I have developed one of these invisible images upon a plate as transparent as clear glass, and brought it up to full printing strength. Part of the plate was cloudy, but in other parts as bright and unveiled as the best negatives made in the ordinary manner. The deep shades were presented by clear glass, the high light as dense as could be wished. This is not a result that can be often obtained, but the fact is there, that such a thing is possible.

The point which at once presented itself for determination was then necessarily this: if these powerful solvents are incapable of dissolving the foundation of the latent image, let us know exactly what they are capable of dissolving, and we shall get some clue as to the nature of the image, and what it rests on.

Of hyposulphite of soda we know this: that it readily dissolves iodide and bromide of silver, but not metallic silver. As to its action on subiodide of silver, nothing seemed to be known. The point was, therefore, examined in the following manner:—

Pieces of glass were coated with metallic silver—not the pulverulent silver thrown down in photographic developments, but with a bright specular film, such as is used for silvering mirrors for optical purposes. Such pieces were then thrown into a weak alcoholic solution of iodine until the surface of the silver was converted into the dark subiodide. Pieces so acted on were cut into halves; one half was thrown into a strong solution of hyposulphite, and left in it very much beyond the time for which hyposulphite is usually applied—for half an hour or more. These pieces, when washed, were carefully compared with their respective halves, and were found to be unchanged. Evidently, if hyposulphite had been capable of dissolving subiodide of silver, the dark coating must have been removed, and the bright silver laid bare. Nothing of the sort appeared, and it therefore necessarily follows that subiodide of silver is not dissolved by hyposulphite of soda.

Taken by itself, this result seems to give a strong confirmation to the views of those who have maintained that the latent image is produced by reduction of iodide to subiodide. For, it will be said, when the exposed and undeveloped plate is thrown into hyposulphite, the latent image consists of subiodide, and resists the solvent, whilst the iodide is dissolved. But this view is most effectually negatived by what follows.

Acid solution of pernitrate of mercury is, as we have seen, capable of dissolving iodide and bromide of silver. To test it on other points, similar pieces of silvered glass to those above spoken of were, after treating with iodine, plunged into precisely the same bath of pernitrate of mercury which had been used for the sensitized plates. I do not here mean a similar bath, varying possibly in strength or acidity, but the bath itself which had served for the previous experiment. In a few moments everything disappeared from the surface of the plates, silver, iodide, and subiodide; and clean glass alone remained behind. This experiment was repeated over and over again with different specimens—always with the same result.

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* *Philadelphia Photographer.*

† This experiment is not to be confounded with Mr Young's, which was executed under different conditions.

Nothing, therefore, can be clearer than that neither silver, nor its iodide nor subiodide, can resist the action of the mercurial solution. And yet a sensitized and exposed plate can be exposed to the action of such a solution, and the latent image escapes its action, and retains its capacity for development!

How are these phenomena to be accounted for?

I think the explanation is as follows:—The latent image is twofold in its nature. When the collodionized plate is plunged into the silver solution, I believe that, besides the iodide and bromide of silver, there is formed a compound of silver with some constituent of the collodion, which silver compound is sensitive to light, though in a less degree than the silver haloids. This organic silver compound appears to be insoluble in hyposulphite of soda and in the mercurial solution, and thus, whilst the iodide and bromide are dissolved, this organic compound remains. The latent image impressed upon the iodide and bromide is, of course, removed when they are removed. The weaker image impressed upon the organic compound, which in the regular development is probably of little importance in the experiments here recorded, becomes the sole basis of development. And this development takes exactly the form which, were this explanation correct, we should expect to find. It is greatly inferior in strength to the regular image, requires careful management, long action of iron and silver, and only in exceptional cases and by unusual good fortune can be brought up to the usual strength of negatives.

Such, I think, is the only explanation of which the facts which I have recorded admit, and it is strengthened by some additional trials which I will presently give. But just here there is another word to say in connection with the foregoing.

In speaking of the latent image, a good deal of uncertainty has arisen from experimenters omitting to make it clear whether they refer to that on the ordinary mixed iodide and bromide films, or on pure iodide of silver. The latent image *par excellence* is that on iodide free from bromide; and as the first experiments here recorded were made with ordinary collodion films, containing also bromide, I resolved to repeat the more important of them on a film of pure iodide, lest in any way the remarkable results obtained should be ascribed to the presence of bromide of silver.

Inasmuch as it has been lately asserted that some of the commercial iodides contain a considerable quantity of bromide, I used iodide of sodium which I myself prepared from a fine specimen of iodine obtained from Rousseau in Paris. Eight grains of this were added to an ounce of plain collodion, which was used a few days after mixing. The iodide of sodium, having no excess of alkali present, quickly coloured the collodion, which was pale sherry colour when used. A plate coated with this collodion was sensitized in a new bath, to obviate the possibility of any assertion that bromide could have been communicated by a bath which had been used with an ordinary collodion. This new bath contained no nitric acid, but was very faintly acidulated with acetic.

This plate, so sensitized, was exposed, plunged into the mercurial solution till perfectly transparent, and washed for half an hour: an iron developer (of course, with the addition of nitrate of silver) brought out a distinct image. It thus clearly appears that in this respect a film of pure iodide of silver behaves in the same way as a mixed one of iodide and bromide.

I now pass to the consideration of one or two subsidiary experiments, which tend to strengthen the views which I have presented above in explanation of the phenomena described.

1. In order to isolate, if possible, the action of the organic compound of silver which I have supposed to exist, and to form a developable image under the action of light, the following trial was made:—

A plate was coated with a moderately old iodo-bromized collodion, was then thoroughly washed till every trace of alkaline iodide and bromide was removed, and was then placed in the nitrate bath.

Here two things are to be remarked:—First, it was necessary to use an iodo-bromized collodion, and wash it, not to simply use a plain collodion, because collodion which has been exposed to the action of iodides and bromides contains organic substances of a very different nature from plain collodion. Secondly, this experiment must manifestly be inconclusive if it had a negative result, because the organic substances which I have supposed capable of forming a sensitive compound might very likely be soluble in water. In such case it would be removed by the washing, along with the iodides and bromides, though under ordinary circumstances it might form an insoluble compound with the silver, and then remain in the film.

This plate, after resting in the nitrate bath, was exposed, but no image could be developed on it. As I have just explained, this result must simply be considered as inconclusive, and not as showing that no organic compound of silver is formed under the regular treatment.

2. If an organic substance exist in the collodion capable of forming a silver compound insoluble, not only in water, but in such a solvent as acid nitrate of mercury, then, by plunging a sensitized plate into the last-mentioned solution before exposure, it ought to retain a portion of its sensitiveness. Experiment showed that this was actually the case. An iodo-bromized plate, sensitized in an ordinary negative bath, washed, immersed into a solution of acid nitrate of mercury, and then thoroughly washed and flowed with silver solution, was given a rather long exposure in the camera. A prolonged development with the collo-developer brought out a faint but perfectly evident image.

This last experiment very strongly supports the view which I have here brought forward, that the sensitive image is double in its nature, light impressing both the iodide and bromide, and also some organic compound formed at the expense of the collodion itself, or rather its decomposition products. I need hardly remind my readers that Van Monckhoven remarked, some time since, that old collodions gave a heavier precipitate with a silver solution than could be produced by the iodide and bromide which it contained. That photographer, indeed, was disposed to attribute this additional precipitating power to the presence of nitro-glucose, but in that case it would seem as if the capacity for acquiring sensitiveness ought not to be removed by washing after collodionizing and before immersion in the nitrate bath.

Finally, I may remark, that if I am right in the view here expressed, that in an ordinary sensitive collodion film there is another sensitive substance present, besides the iodide and bromide of silver, it will, on the one hand, greatly increase the difficulty of deciding correctly upon the nature of the latent image; and, on the other hand, the recognition of this fact will tend to prevent the drawing of incorrect conclusions from experiments made in these directions: as, for example, it entirely refutes the conclusions drawn from Young's experiment by those who advocate the chemical theory, and leaves them without a single well-ascertained fact on which to base their hypotheses.

Proceedings of Societies.

London Photographic Society.

We resume our report of the proceedings at the last meeting of this Society, held on the evening of Tuesday, February 13th.

The business transactions of the Annual Meeting having been concluded,

Mr. How exhibited Sarony's Patent Posing Apparatus, explaining its advantages, and showing its mode of working.

Mr. **Mayall** had tried this very ingenious instrument for the last few weeks, and found it effected most efficiently what had been almost looked upon as a hopeless case, the securing of the portrait of a tremulous, palsied sitter. The value of the instrument as a rest was enhanced very materially by its extreme simplicity, and in the application to its construction of the good common-sense notion of putting plenty of material in it, so as to ensure perfect firmness. It most effectually answered the purpose for which it was intended; but he would suggest that it was rather too heavy, and that it required the introduction of a coil or spring in the pedestal or tube, to check the heavy fall of the upper portion, which might be attended with serious inconvenience. The mechanical principles applied in the apparatus were of the most simple and beautiful character, and so judiciously taken advantage of that the operator could get any possible pose which might be desired. He had no hesitation in saying that photographers who were "afflicted" with children during winter time would find here the means of getting over these "little difficulties." Although the instrument had been patented, the cost of it was put down so low as to lead to the hope of its general adoption. For ladies he was certain it would be found of great use; it would give them confidence, and photographers would have less trouble in getting them to sit still. He was not in the habit of giving testimonials to trade matters; but this, from its importance to photographers, and its excellence, induced him to make an exception to his general practice.

The Chairman then called attention to some specimens, by Mr. Mayland, Mr. Blanchard, Mr. Cooper, and others, illustrating the working of a new rapid triple for portraits, groups, &c., by Mr. Dallmeyer. He also called attention to an album of fine specimens, by Mr. Ernest Edwards, of views in Switzerland, taken chiefly with a view to illustrate the glacier theory.

The Chairman then said he wished to call especial attention to the next subject. It was a matter which, had the Lord Chief Baron been able to attend, he would, no doubt, have made a point of especially referring to, since it was one of great interest in connection with photographic art. It related to the establishment of national and local museums or galleries of photographic portraits of celebrated persons. The movement originated with Mr. M'Lachlan, of Manchester, whose appeal to photographers our readers are familiar with, which he read to the meeting. Mr. M'Lachlan now appealed for co-operation to photographers at large. In bringing the matter before the Society, he (the Chairman) wished to call attention to a portrait of the late Prince Consort on the table, which he believed was intended by Mr. Mayall to form one of his contributions to this collection at Manchester. [The Chairman then passed round for inspection a fine collodio-chloride whole-plate portrait of the late Prince Albert.] It was to be noticed that this was the first public recognition of the photographic art by a corporate body, or by the local authorities of any large town. Whatever had been done hitherto had been done by numbers of gentleman associating themselves together for the advancement of the art, getting up an exhibition, or for their own special instruction. Here, however, was a definite recognition, by the large and important city of Manchester, of the value of photography in supplying the means of handing down to posterity correct representations of the great men of the day. A few years ago the accomplishment of this would have been impossible. Before the discovery of the mode by which photographs could be made permanent, no one would have cared to transmit one to his descendants; but the great improvement introduced by M. Camarsac and Mr. Wharton Simpson (whose process, he believed, had been adopted in the portrait of the Prince now exhibited) in rendering portraits permanent, warranted the view which the Corporation of Manchester had taken, that they would be able to establish a collection of portraits almost equal in immediate interest to the famous collection in London, and at the same time far less expensive. He should be glad to hear any suggestion the Members wished to offer on the subject, and he was sure the Corporation of Manchester, who had started this Exhibition, and to whom great credit was due for fostering the idea, would be glad to receive such suggestions from so important a body as the Photographic Society of London, and to learn that their proposition had received the cordial approbation of this, the first Photographic Society in the world.

Mr. Mayall said they should not allow so important a communication as that just read by the Chairman to pass without the Members of the Society taking some definite notice of the fact that this was the first time photography had been recognized as of so much importance as to justify the formation of a Museum by the corporate body of a great city like Manchester. He happened to know one or two of the gentlemen who had taken an active part in this matter, more particularly Mr. M'Lachlan and Mr. Heron (the Town Clerk), and he was sure, from the zealous manner in which they had taken up the question, and the considerable expense they had been at, there was an ample guarantee that the proposal would be most efficiently carried out. Nearly every photographer would be able to contribute something to so important an object: most of them would feel a pleasure in doing so gratuitously; but, if need be, the Corporation of Manchester were prepared to pay for the portraits of eminent men; but he hoped that photographers would feel it an honour to contribute freely. He (Mr. Mayall) intended to give a dozen portraits of the late Prince Consort in different positions, so that it would be impossible for any future Durham to fail in getting a perfect likeness, if he desired to prepare a bust of the former patron of this Society. It was impossible to overrate the importance of such a Museum in future time. Mr. Claudet, like himself, was in possession of many hundred portraits of men of eminence, and no doubt photographers all over the country would be able to add to the collection a large number. There was nothing in the establishment of such a Museum in Manchester to prevent a similar effort being made for the Metropolis, with duplicates of the same portraits, or any others. It seemed to him rather singular, however, that the portraits should be sent to France to undergo M. Camarsac's process. He (Mr. Mayall) in 1855 exhibited to this Society a series of little portraits, some of which eventually found their way into the hands of the Queen. They were done by a process which, if adopted now, would save the necessity of sending to France. He got a piece of copper which was glazed over with a black glaze of glass. He then prepared a collodion surface with a bath very acid with nitric acid; upon this he took a positive image, and fixed it in cyanide of potassium, washing it very carefully. It was then put into a muffle furnace (it was astonishing how much heat an ordinary photograph would stand before the image was destroyed) upon a little spatula of porcelain, till it got slightly heated, when it was taken out, a piece of thin microscopic glass was placed over it, and again placed in the muffle. Almost in a moment this was melted down upon it, and the portrait became hermetically sealed. Now, as the positive image taken with a very acid nitric-acid bath, and developed with proto-nitrate of iron, was almost pure silver, or silver in an extreme state of reduction, there was nothing in that image which could possibly fade if fixed with cyanide of potassium. He had now a muffle ready for trying Mr. Simpson's process, and he had no doubt he should succeed. With reference to the establishment of such museums as had been inaugurated at Manchester, he would only add, that he thought it very desirable that all the learned societies in London should take up the idea, and perpetuate the memory of their great men by handing down their portraits to a future generation. A city like London, containing perhaps two-thirds of the men of acknowledged eminence in the world—men like Faraday, and Herschel, who must in a few years pass away—should be the foremost in such a movement.

Mr. Durham had one word to say with regard to the use of photography in art. It unfortunately happened very frequently that persons were not employed to paint a picture or produce a work in sculpture till the eminent man it was desired to preserve a memento of had passed away. Then it was that friends and relatives and admirers began to think it right to have some permanent record. Hence he apprehended that to all future time collections of actual portraits would be of the most essential service to art. For his own part he frankly acknowledged that he was deeply indebted to photography. The first thing he now did in preparing a bust, if the person was living, was to obtain a photographic portrait, which he sometimes had enlarged. From this he found that he could work, for he had merely to measure the head: the rest all fell in with practice. The result was, that when persons came to sit to him, they found his work was so good a likeness that he had heard them say, "It is of no use going on any further; you will never get it more like!" and this was in working from the photograph alone. He remembered that in the year 1850 he was intensely puzzled in getting a likeness of Guizot; he never saw that great man look twice alike, and would have been glad enough to have a photograph of him. After Guizot had about six sittings of an hour and a half, or perhaps two hours each, he apologised for having taken up so much of his time; he replied, "Don't mind that; when I sat to Paul Delaroche for a profile, I sat a countless number of times." Photography, by reducing the number of hours required for this purpose, was a boon alike to artists and to sitters. The latter was no small consideration, because to sit for a portrait was a most uncomfortable thing. One always seemed to think there was something requiring to be done, without remembering what that something was. For himself, he could candidly say that he never sat for his photograph without feeling himself perfectly miserable, and no doubt when folks sat to him it was just the same. He did not like to work at them with their mouths down and their eyes weary; when he found them like that he left off looking at them, and turned to their photographs.

Mr. MAYALL said he thought the manly way in which Mr. Durham had spoken was a complete answer to those artists who affected to despise photography, but who no doubt, in secret, were glad to avail themselves of its services.

Mr. JABEZ HUGHES said it was scarcely necessary to discuss or dispute that it was very desirable to have historical portraits possessing the unchallengeable character of good photographs. The idea having been once started, he hoped many other corporate bodies would follow the example of Manchester. But the proposition would never be fully and properly carried out until it was taken up in London. Many would contribute to a gallery in London who would not do so to any provincial town. While, therefore, he accorded the highest praise to Manchester for initiating such collections of portraits, he expressed an earnest hope that London would not be long behind. In reference to the suggestions in Mr. M'Lachlan's prospectus respecting the size, &c., of the portraits presented, he said he thought it would be well, wherever practicable, that they should be stereoscopic. Such portraits had a double chance of not being destroyed by accident, and when placed in the stereoscope a new photographic truth was revealed, which was not evident at first sight, and which, for artistic purposes, would be valuable, the sense of projection giving an element of character which the plain simple picture did not give.

Mr. M'LACHLAN said his first proposition was that they should be stereoscopic, but it was found that, for that purpose, many portraits would have to be taken over again, and therefore he did not press it specially. Still such portraits might be sent.

Mr. M'LACHLAN gave some details of the origin and progress of his idea, and of his satisfactory prospects for the future.

The CHAIRMAN announced that Mr. Dunmore would, at the next meeting, read a short paper on "The Organico-Iron Developer;" and for the April meeting, Mr. Mayall and Mr. Joubert would each prepare a paper on "Photographic Enamels."

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Correspondence.

"HALF TALENTS."—STUDIES IN PHOTOGRAPHY.

SIR,—It is related of the Rev. Robert Hall, that, being consulted on one occasion by a young man who desired to enter the ministry, and whose fitness for the sacred office was not very apparent, Mr. Hall asked his motive for aspiring to the pulpit. The young man replied, that he thought he had some ability for the office, and that he did not wish to hide what little talent he had in a napkin. "Put it in your pocket handkerchief, sir; you will find that quite large enough!" was Mr. Hall's response. Possibly your correspondent, "An Artist," who asks, "What is half a talent?" would prefer the fashion of speech which refers to a small talent to that which speaks of part of one. A quibble as to the form of a figure of speech is scarcely sufficiently important for discussion; but as I quoted and indorsed Mr. Carey Lea, whose phrase is called into question, I must ask for a very small space to point out that Mr. Lea, with a keen and scholarly recognition of the analogies of the word, was strictly correct in his "arithmetical division" of a talent, and that he would have been less so if he had referred to "varieties and degrees of talents." The derivation of the word *talent*, as applied to natural capacity, is traced by philologists to the scriptural parable in which a talent, representing a specific sum of money, is used to typify the amount of natural endowment with which a man commences life. Hence, to preserve the analogy, a talent is more fitly treated, in a *façon de parler*, by dividing it into halves and quarters than into "varieties and degrees," in which all harmony with the analogue would be lost.

But, sir, I would with all earnestness protest against the notion that any man should be twitted with his incompleteness of talent, or that success in art can only come from "heaven-born genius." To teach such a doctrine is to discourage the art-student. I would also protest against the "awe-inspiring mysteries" in which art is wrapt by some teachers; these bewilder the art-student. I would also protest again, as I have done already, against the student wasting his time in producing unmeaning fragments, fondly imagining that he is producing "studies;" such practices deprave the taste and dwindle the powers of the student, instead of elevating both.

As my aim, in the occasional papers sent to the PHOTOGRAPHIC NEWS, is to suggest thought, or possibly, at times, convey instruction, I desire to avoid the controversy which becomes offensive in terms, and I will not, therefore, comment upon your correspondent's imputations of "prudishness" or "grandiloquence," nor say how little of the first, and how much of the last, characterizes all *his* letters, easily distinguished under his many different signatures.

He quotes an apothegm, to which you, sir, have given a specific value in art photography: "The touchstone of legitimacy is success." It was because the practice I condemned led to failure, and not to success, that I was especially led to denounce it; because, of late years, such a number of puerile abortions had been exhibited as photographic studies, tending to make the art a derision and a bye-word, that I interposed a word to point out the evil. I condemned not the attention to study, but the heaping together of incongruous things of all styles or of no style, without either knowledge or purpose, then conferring on the odd conglomeration a name, and exhibiting it as a "study." The fact that, in some able hands, even this aimless mode of working produces at times pleasing and saleable pictures, and that some persons live by such a practice, is poor justification. Many artists live by producing a class of pictures described as "pot-boilers," but I never heard one justify the practice on any higher ground than the necessity of living.

By all means let the photographer study: let him study art in books; in pictures; in nature; in his own studio: but let him study with an aim. Every meaningless effort is a waste of strength. Let him study lighting especially; and let him study it on a plaster bust. "An Artist" says that this will not yield the same result as studying it on the human figure, because one is simple, the other complex. This is just the reason why I recommend the plaster bust to the young student: he should commence his studies under simple conditions, avoiding the complex ones until he has quite mastered the simple ones. Whilst studying the effects of light on a white bust there is no disturbing influence of colour; he sees exactly the effect of light from a certain direction in producing light, reflected light, and shadow in his picture. Having once learned to produce and recognize on the bust, when produced, satisfactory and pictorial effects of light and shadow, he will soon learn to apply what he has learned to the lighting of the living model.

Apologizing for trespassing so far on your space with explanatory matter, I am, sir, yours, RESPICE FINEM.

LIGHT FOR THE STUDIO.

SIR,—I am afraid I scarcely succeeded in making myself understood in my last communication. It was not my intention to provide a shade for the lens, because I hold that no studio can be perfect where the necessity for so doing exists. Why, sir, the mere fact that the lens requires shading is a proof that the building does not fulfil its purpose—a confession that something is present which it is not only desirable to be rid of, but which is positively injurious to the pictures. Now, "shading the lens" will never get at the root of the evil, unless the shades are carried in a line from the hood of the lens to the extreme ends of the windows (*i.e.*, unless the whole of the glass is covered and the light entirely shut out), for if but one single inch of glass is left unprotected, the light that cannot reach the sitter will fall upon the floor, or the sides, or the surrounding objects, and being indirectly reflected into the lens, and upon the sitter, will inevitably sully the shadows and destroy the brilliancy of the picture.

The old proverb says, "Remove the cause, and the effect will cease." Now, "shading the lens" will only partially "remove the cause." But the sitter—the unfortunate sitter—what has he done that he should not be protected also? Light is impartial, and will not respect him any more than the lens. Shall we, then, rest satisfied with "half measures"? If so, where shall we draw the line? I contend that "false light" should be as rigorously excluded from the studio as from the camera and dark room. But how shall it be done? It is obvious that we cannot put the whole of the "false lights" out; but, sir, we can do better, we can prevent them from coming in, by taking our shades outside, and placing them in such a position that, while they cover the whole of the glass, they do not intercept one single ray of direct light, which still enters at the same angle and in the same quantity as if they were not in existence (see the diagrams in your impression of the 9th inst.) Now, sir, the end is answered; the proper remedy has been applied; the "false lights," never having been lit, cannot do any harm, and the lens may safely be left to take care of itself, for the simple reason that there is nothing before it but what it is required to copy.

The advantages I claim for this method of lighting are, first, as the sun *never* enters the studio, the operator can make the most of his working hours, and produce negatives of more equal quality during the whole of the day; secondly, that as no light is present but what is actually useful for producing the picture, unexampled brilliancy, gradation, and force are the result; thirdly, cast shadows can be obtained upon the floor and background; fourthly, better results can be secured with large apertures, for the stop has a two-fold purpose,—finer definition and depth of focus, and to pierce fog; fifthly, that as the sun is entirely excluded, the studio will no longer be a "hot house"—a condition the public will not fail to appreciate, and which alone would amply repay the extra cost of construction, because sitters are apt to "recommend," and it is but reasonable to presume that the most comfortable studio (all other things being equal) will be the most extensively patronized.

Of course my system of lighting will meet with all sorts of objections; for instance, one section of the profession will say, "Oh, I don't want any-new fangled ideas about light;" "I can take very good pictures now;" "capital pictures;" "charming pictures;" "wouldn't wish for anything better," &c. Well, sir, we'll admit this argument; but let us hear no more about "photography being in its infancy;" rather let us leave off puzzling our brains, and sit down with the comfortable conviction that there's nothing new to be found out. Another section will exclaim, "Look at the expense!" "Look at the difficulty!" Granted; but what are we to do? We are, as it were, driven into a corner, and must choose between a perfect light and inferior pictures. Besides, the "difficult and expensive" argument might be applied equally well to a "flour mill," or a "baker's oven," yet we neither grind our corn by hand, nor bake our bread in the ashes, as our forefathers did; and shall photography, the most glorious invention of the age, be treated worse than a sack of corn, or a loaf of bread, and denied a suitable habitation, built upon scientific principles? The question narrows itself to this:—Either the principles I advocate are correct, or incorrect; if incorrect, reject them at once; but if correct, no true lover of his art will rest until he is in possession of a studio shielded in the manner I have described.—I am, sir, yours respectfully,

R. A.

[There cannot be a doubt that our correspondent is perfectly correct in principle; but it is doubtful whether it is necessary, to secure good results, to carry out that principle to the extent he recommends, especially as in some instances the outside sunshades might be difficult to apply, and might be unsightly and offensive to neighbours. The system of screens we described in an article on the subject of lighting in our eighth volume, and also in our Year-Book for 1865, providing for the exclusion of unnecessary light, effects, we think, the end in view with little trouble, cost, or annoyance to others.—Ed.]

ANOTHER WORD FOR SUGAR IN THE DEVELOPER.

Sir,—Mr. Hislop's useful article reminds me that I had written a letter to you some time ago on this very subject, but from some cause or other neglected to send it. I have great pleasure in now giving corroborative evidence as to the excellent results obtainable by the addition of *loaf* sugar to the iron developer. A friend recommended it to me in October last, and it has proved such a useful servant, that I have employed it constantly ever since. Its great point lies in its mechanical action, by making the liquid flow in a smooth, oil-like wave, over the plate, and allowing the use of a much stronger solution than usual without fear of stains.

My formula is a very strong one (sixty grain), perhaps too strong for summer use, but invaluable in winter, and rarely needs a second application. The enclosed print will give you an idea of the class of C.D.V. negatives it produces, and I find it equally successful in out-door operations, especially when manipulating large plates.

My formula is in the following proportion:—

Proto-sulphate of iron...	4 drachms
Loaf sugar	3 "
Glacial acetic acid	2 "
Water	4 ounces

I can recommend it as a thoroughly good developer, one that with proper management will shorten exposure, accelerate development, and produce brilliant negatives. And now I conclude, in case any one should call me a "sugar baby."—I am, sir, very truly yours, Peter Hopwood.

[Mr. Hopwood encloses, as an illustration of the working of the saccharated iron solution, one of the most perfect photographs we have seen for a long time.—Ed.]

Talk in the Studio.

Collodio-Chloride in America.—Without doubt the most important improvement in our art during the past year is the collodio-chloride of Mr. Simpson. It is such a simple and certain process that it was at once adopted by the profession; it has become a standard method, and will probably last as long as chloride of silver is used in printing. We do not remember that in the history of our art any other process has so soon received the endorsement of our most competent experts. —*American Journal of Photography.*

The late Mr. Goddard.—We have received from Mr. Dallmeyer a letter calling our attention to the necessitous circumstances of the widow of the late Mr. Goddard, an optician to whom photography was indebted for much ingenuity and study devoted to its interest. Mr. Dallmeyer, who encloses a letter from Mrs. Goddard, stating her case, has relieved her immediate need, and will take charge of any further aid which may be forwarded by those interested in the case. We generally object strongly to the practice of making appeals for charity through the pages of a scientific journal; we suspend our rule on this occasion to meet a deserving case, and in deference to the wish of the gentleman, so highly respected by photographers, who brings the case under our attention and recommends it for the consideration of our readers.

Sir Thomas Lawrence's Portraits.—Mr. Wallis writes to correct a misconception of his meaning in the *résumé* of his lecture on Elementary Art, which appears in our last. In speaking of the practice of Sir Thomas Lawrence, he meant to say that he rarely, if ever, painted the portraits of short men (not *tall* men) in a standing position, short people, as a rule, looking best when seated.

Cameras for Doubles.—Mr. G. Williams, of Holloway, sends us some examples of double and quadruple portraits, with an intimation that he has contrived a simple and efficient modification of the camera for easily producing them, which may be applied to old cameras, arrangements having been made to effect this at the establishment of Mr. Hughes, Oxford Street. The object in view is not so much to produce "doubles," as to afford facilities for producing groups in which the various figures are taken in succession, thus giving freedom of arrangement and facility for focussing each figure, and securing definition in all.

Photo-lithographic Reproductions.—It is stated that the Academy of Sciences at Stockholm are about to publish a facsimile of an interesting relic—a photo-lithographic copy of the first edition of the "Systema Naturæ" of Linnæus, a folio of about fourteen leaves. Though very thin, it contains the groundwork of nearly all that the great naturalist accomplished.

To Correspondents.

Marsh Photo.—You may easily make a water-tight bath by the method you propose. The plan is to have a shoulder at the top of the mahogany case; the metal clamps will be held by the shoulder, and will enable you to screw down to the top, lined with India-rubber, and so make the bath water-tight. The india-rubber may be from one-eighth of an inch to a quarter of an inch thick, and must not be vulcanized; the latter would injure the silver solution, but the pure will not. The lighting and toning of the picture enclosed are good. Is there a little reflected light entering the lens, and slightly injuring brilliancy?

Anglo-American writes, asking us to permit him to give an "unqualified contradiction" to the statement, made in a contemporary, that any American photographic journal consists chiefly of extracts from said contemporary. He affirms that America is not behind this country either in the practice of photography or the excellence of its photographic literature, and asks us to refer to the pages of the *American Journal of Photography*, the journal especially attacked, and state whether the charges of wholesale copying are true. Our correspondent's letter should have been addressed to our contemporary, as many portions render it inadmissible in our columns. We have the highest esteem for all our transatlantic contemporaries, and have the good fortune to preserve the most friendly relations with them. Our readers know our high appreciation of the journals in question, seeing that we occasionally publish interesting extracts from all. We have not time to carry out our correspondent's request at length; but glancing at the only two copies of the *American Journal* which chance to be on our table, December 15th and January 1st, we find in the first no extract from our British contemporary whatever; in the other, which is referred to by the same contemporary as containing six articles taken from its pages, we find that there are really four extracts from its pages—one a practical editorial article, one *résumé* of recent patents, one translation, and one paper read at a society.

J. W. Gatehouse.—You will obtain all details regarding the conditions of membership of the Chemical Society by writing to the Secretary, Dr. Odling, at Burlington House, Piccadilly, where the Society's meetings are held. Fellows of the Society are entitled to the use of the letters F.C.S.

Kent.—As a rule, the varieties in the qualities of albumenized papers sold by various houses depend chiefly upon the albumenizing and salting, as all are supplied from two paper manufacturers, one making the *Rive* paper and the other the *Saxe*. The latter, as a rule, is most free from metallic spots, and gives the softest pictures; the former is not, as a rule, quite so free from spots; but has a hard surface and gives brilliant prints. The hard surface and peculiar sizing of the latter seem to keep the layer of albumen quite on the surface, without any incorporation with the body of the paper, and hence the facility with which, under some conditions, it blisters. In the paper, as sent from the mills, there are first and second qualities; the most respectable albumenizers secure the first quality, while some, less scrupulous, use the second and cheapest quality, which consists chiefly of sheets rejected from the first quality. In all cases, however, *Saxe* and *Rive* will retain each its generic character. In the list of names you submit there are some very good makers; but the only one of which we can speak in high terms of personal experience of the paper is No. 6; we have heard very good accounts of No. 2 and No. 7. Thanks for the kind and complimentary form of your congratulations.

Excelsior.—We do not know of any work on the grinding and polishing of lenses. The only mode in which you can gain any available information on the subject will be by seeing the operation. When you ask if lenses can be purchased rough from the mould, you are evidently under the erroneous impression that they are cast or moulded into form whilst the glass is in a plastic state. Each lens is cut from a flat piece of glass, and ground to its proper form.

W. T. D.—The only conjecture we can form is that some error in the proportions had occurred in mixing. The formula we gave recently in the News, and also in our Year-Book, yields excellent results, and is very sensitive. We frequently print sufficiently deep on opal glass with five minutes' exposure to sunlight. A *toned* or *tinted* opal glass would doubtless have an exceedingly beautiful effect; but it is only made, we believe, of a pure white. If you can call upon us some time, we can show you what has been done.

J. H. (Cheltenham).—There are two different kinds of stains or discolourations in the print you forward—a yellow stain of imperfect fixation, and some which look like nitrate of silver stains after the completion of the print.

One who studies the News.—Howard's *Sketcher's Manual* is a very good introduction to art study for a photographer. Burnett on *Composition* and *Chiaroscura* is not difficult to understand. We have no intention of reprinting Lake Price's articles at present. Your only mode of securing them is to look out for chance copies of our 3rd and 4th volumes for sale. A silver dipper may be left in a neutral bath, but if the bath contain much nitric acid it would gradually act upon the dipper. We prefer glass. 2. There is no benefit, but often positive injury, in daily filtering the nitrate bath. The use of a dipper which does not permit the plate to reach the bottom of the bath, and which consequently escapes any stored-up deposit, saves a great deal of filtering. 3. The reduced gold of which you speak may be dissolved out by means of nitro-hydrochloric acid. 4. The term cabinet picture in photography has been given to the size introduced by the use of the No. 1 triple, and is about 7 inches by 4½ inches. We have not heard the term applied to portraits. 5. The continued application of gentle heat will evaporate all acid and water, and your nitrate will eventually crystallize. 6. It is common to speak, in photography, of one grain of gold when one grain of chloride is meant. One grain of the chloride, skilfully used, will tone two sheets of paper; but something depends on the character of the pictures. A picture abounding in blacks requires more gold than one with a good many light tones.

W. J. C.—Pinholes may proceed from so many causes that it is impossible to prescribe one remedy that shall certainly remove them. Are you certain that you are not over-iodizing your bath? See article in the present number of the News.

An Amateur (Argyleshire).—We always avoid the use of acetic acid in the nitrate bath, as it is not necessary, and very difficult, if not impossible, to eliminate without throwing down the silver. The best plan, when excess of it has been added, is to dilute with more neutral nitrate bath. 2. The recommending fresh hyposulphite solutions for fixing is to secure the use of a fresh quantity every time. It does not take any harm from being kept in solution, but there is always risk in using it over and over again. You may, with propriety, keep a stock in solution ready for use, but avoid using the same quantity over and over again. 3. You cannot ascertain the strength of a silver solution without apparatus. 4. Ordinary glazed earthenware would not be safe for boiling down a nitrate bath. Some kinds might possibly answer, but in others the glaze would crack. As a rule, a porcelain vessel would serve, but it is much safer to use a proper evaporating dish. The vitreous ware of Edwards and Son, of Burslem, kept by most photographic dealers, answers admirably. 5. In sunning a bath, it may be exposed in a bottle. The discolouration of the printing bath is of no moment when it does not affect the purity of the print.

West End.—The stain in your print is the result of imperfect fixation, and is caused by the use of weak, old, or acid hypo, or imperfect immersion.

Old Pupil.—The distance beyond which all objects will be in focus depends on the aperture as well as the focus of the lens. It is calculated that with a lens of one inch focus, and an aperture of one-fortieth of that focus, all objects beyond a distance of 4 feet will be in focus. Following the same calculation, and adding 4 feet for each inch of focus, you may ascertain the distance with any lens. Thus, with a lens of 10 inches focus, and a quarter of an inch stop, all objects at a distance of 40 feet and upwards will be sufficiently defined. 2 The same applies. 3. You formed nitrate of ammonia. 4. Proto-sulphate of iron is soluble in twice its own weight of water; one ounce of the iron salt added to two of water would therefore give you a saturated solution. Its solubility in acetic acid would depend on the strength of the acid. The simplest plan is to try. Potash is the hydrated oxide of potassium.

Nemo is thanked for his cordial letter defending the "Old Photographer" against an attack in a contemporary; but the defence is unnecessary, as such abuse, coming from such a quarter, is harmless. Where mis-statements on questions of science, art, or fact are made, we are often compelled to permit discussion in order to prevent the circulation of error, but we do not care to permit unpleasant controversies on personal grounds, or on matters of opinion or taste. When a baffled and angry disputant said to Dr. Johnson, "You are no gentleman!" the Doctor responded, "You are no judge!" In like manner we regard the abuse of our contributor (who is quite unscathed) by "Semper Vigilans," and we are quite content to let it pass for as much as it is worth. The identity of the writer, thinly veiled by various *aliases*, and often revealed by his odd notions of grammar, suggests the absurdity of his assumption of the position of an arbiter of taste, and precludes the necessity of further notice.

Lux.—We in all cases prefer a ridge roof. We believe a sloping front light is used in the case you mention, and the results are not good. 2. We are not in possession of details as to the rapidity of the promised lens.

R. W. J.—A good bellows-bodied camera will answer perfectly for the size you mention. 2. Of the four you mention, we prefer No. 1; consult the maker. 3. A good single lens would answer. Mr. Wilson has taken his fine cabinet-sized instantaneous sea views with the No. 1 triple.

A Looker-on and Subscriber.—The question of payment for unsatisfactory portraits is a difficult one, and cannot be decided by any universal rule. Generally, it is better to show a proof before printing the full number, and give a re-sit if the portrait be not satisfactory. The law of the case for the photographer would probably be the same as for a tailor; if a coat be not a fit the customer is not bound to take it and pay for it. In the case in question it is difficult to give an opinion without knowing more of the facts. But the decision that the photographer should give another sitting seems right.

Thomas Nicol.—There is a little work published on the subject by Mr. Cox, of Skinner Street. You will find much of the information you require in our Year-Book.

Carlneish.—The case you describe is one in which we, unfortunately, cannot help you, nor offer advice. It is excessively mortifying to have to pay for a useless enlargement; but, on the other hand, the enlarger may state that it is the best the negative will produce. Whether this is the case or not we cannot tell. We know nothing of the gentleman you name; and we cannot say whether he is able to do good work or not. But you will see that it is a case in which no advice or opinion could be given without seeing the negative and the enlargement, and in such case we could not undertake the office of arbiter.

Bryan O'Lynn.—You do not state the nature of your failure. Describe your operations and the result, and we may possibly be able to help you.

Thomas's "Modern Practice of Photography" received, and will be noticed in our next.

An Old Sub. (Nottingham).—We shall be glad to have the continuation of your remarks, so as to have the whole before us. The portion received is very satisfactory.

Registrations and several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PERMANENT PHOTOGRAPHIC PRINTING.

It is somewhat curious to trace the growth of ideas in connection with an art of rapid progress, like photography, and note how that which at one time was regarded as belonging to the "fairy tales of science," as a thing to be dreamed of, but scarcely hoped for, passes in a year or two into the region of recognized matter of fact, exciting little or no interest whatever.

Years ago photographers would ask, with wondering uncertainty, "Shall we ever have a permanent printing process?" and in answer, carbon printing began to dawn on the public mind as a possibility; but its results were rough and crude, and wanting in delicate gradation. Photographers then wondered whether carbon printing would ever become sufficiently perfect to render delicate half tone; and shortly M. Fargier produced carbon prints which vied with silver prints in every quality of beauty. The process, however, seemed impracticable and uncertain, and photographers wondered if a practical and commercial carbon process, giving good results, would ever be discovered. After two years' experience, Mr. Swan has reduced his carbon process to a state of certainty which permits him to undertake printing commercially. His results possess the utmost beauty, surpassing, in some instances, the best silver prints; but with all this, the realization of an idea which at one time it seemed almost extravagant to hope for, we fear that the full value of such a boon to photography is scarcely fully apreciated by many. Some seem indifferent, and think that silver prints are really very good: many of them have lasted a long time, and will last long enough for them. Others insinuate doubts as to the permanency of carbon prints after all. The gelatine with which the carbon is mixed, either in carbon prints or photo-relief prints, is, it is suggested, a perishable material, and will probably crack off the paper. And finally, there are some who affect to despise such improvements altogether, and ask, "Who would be content with a carbon picture who could obtain a fine silver print?"

We think that this state of things is to be regretted, and that, notwithstanding the longing desire which photographers have often expressed for permanency, they are less in earnest in obtaining it than they ought to be. "If," said one of the most distinguished photographers in London to us a short time ago, "if I were to take all my pictures over again which have changed colour and begun to fade, I should be ruined." This must be the experience of others; but we have not heard of a single photographer who has any intention, at present, to supply his customers with carbon prints. This must arise from other causes than indifference in portraitists to the stability of their pictures. Let us, before examining the possible objections, briefly state the process as it is now worked by Mr. Swan.

A sheet of paper is coated with gelatine and a permanent pigment, the exact tint of which may vary as occasion demands, a warm black generally being chosen. The paper so prepared may be kept ready for use, and will shortly, we believe, be supplied ready for use by Messrs. Mawson and Swan. When required for use, it is excited by immersing in a saturated solution of bichromate of potash. The paper is, after drying, exposed under a negative, the coated side in contact. The exposure is determined by the aid of a simple actinometer, the depth a piece of silvered paper acquires, placed under similar conditions as to the action of light, indicating the right exposure with accuracy. The sensitive film of pigmented gelatine is now coated with a solution of india-rubber, and when the solvent has evaporated, a piece of india-rubber coated paper pressed into contact with it, the two surfaces of india-rubber readily adhering. The whole is now placed in tepid water, where, in the course of half an hour, the original paper, to which the film of gelatine and pigment had been applied, floats off, leaving the film on the paper, to which it is attached by india-rubber. The unacted-on gelatine and pigment, at the side opposite to that which was in contact with the negative, is now washed away, developing the picture in its perfect gradations. It is then washed and dried, and the picture is completed; but it is reversed. The next step is an interesting feature in the process. The print, having been coated with gelatine and dried, is now trimmed to the proper size and shape required for mounting. It is now placed in contact in its proper place on a mounting board which has been damped, and submitted to heavy pressure. The image itself is now firmly attached to and almost bedded in the cardboard mount, but it is still covered up with the paper, to which it was attached for the purpose of developing with india-rubber cement. Slightly moistening this with benzole, it comes away, leaving the image on its mount, non-reversed, perfect and beautiful.

At first sight there appears to be here a greater number of operations than are required in silver printing; but on careful examination, we think it will be found that the operations are neither more numerous, tedious, nor difficult than those of silver printing, whilst the results are more certain and uniform, as well as cheaper and more permanent. Let us place the operations, necessary in each process, side by side for comparison:—

Carbon Printing.	Silver Printing.
Preparing paper with pigmented gelatine.	Albumenizing paper.
Exciting with bichromate.	Exciting with silver.
Exposing under negative.	Exposing under negative.
Mounting with india-rubber.	Washing and toning.
Developing and washing.	Fixing
	Prolonged washing.
Trimming and mounting.	Trimming and mounting.

Thus it will be seen that, numerically, the operations are fewer in carbon printing than in silver printing. Possibly they may require more skill, but it is difficult to state accurately without further experience. On this subject we may quote the opinion of a very able and intelligent photographer in Paris, whose name we do not mention because the letter is a private one. He says: "Carbon printing is easy enough: I have printed my twenty proofs per day without difficulty. I prefer carbon printing to albumenized paper printing, as it is quicker, cleaner, and gives better results." The one difficulty as to determining exposure is met by Mr. Swan's exceedingly simple actinometer.

That the results should be better may be easily deduced from several considerations. By the use of a well-chosen pigment it appears to us that a more extended and perfect scale of tones is possible than can be obtained in a silver print. The deepest tone of the latter rarely equals in depth or richness the tone which can be obtained by means of a fine pigment. It is possible in silver printing to prepare paper suited to various qualities of negatives, but it is more easily done in carbon printing. The more colour there is added to the gelatine the more forcible and full of contrast will be the print; and the less colour the feebler the contrasts; thus great range of effect is possible. In silver printing, uniformity of tone is very difficult to obtain; in carbon printing nothing is more simple.

On the question of permanency the answer is very simple, both in relation to carbon prints and photo-relief prints, which are really mechanically-produced carbon prints, and which we hope eventually to see as delicate and perfect as carbon prints. We know silver prints are not permanent: the stability of prints formed of carbon mixed with gelatine remains, it is true, to be proved by time; but the reasons for doubting their permanency have little weight. Gelatine, it is said, is a perishable material: nevertheless, with gelatine all English paper is sized; and the amount of gelatine present in a carbon print is probably about the same proportion as there is in the sizing of a piece of paper of the same dimensions as the print. The gelatine in a carbon print, or a photo-relief print, is rather analogous to leather than to gelatine in its usual perishable condition, having been rendered in both classes of prints insoluble by the action of chemical agents.

We urge the subject of carbon printing upon the attention of our readers because we fear that now that is a possible process it will receive less attention than it deserves. A certain amount of excellence is so easily obtainable in silver printing; the instability of the prints is not immediately apparent; all the operations are in full swing; experience has been gained in silver printing, it will have to be gained in carbon printing. All these facts tend to maintain the present system and retard the introduction of a better. But we believe that silver printing—for the highest and best class of work, at least—must be doomed, and that honour and profit will be gained by those who first take up carbon printing in earnest.

We are glad to announce that the South London Society is just making arrangements for presenting a carbon print to its members. This will be interesting, as showing the practical stage of carbon printing on a large scale, as distinguished from the experimental stage in which it has been familiar to the public. We believe that the North London Society contemplate a similar step.

We had intended to notice some of the recent steps in permanent photographic printing by means of the printing press; but we must defer our remarks for the present.

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Critical Notices.

THE MODERN PRACTICE OF PHOTOGRAPHY.

By R. W. Thomas, F.C.S. (London: Harrison, Pall Mall.)

Mr. Thomas's excellent series of pamphlets, containing valuable and accurate instructions and formulæ in various distinct branches of photography, such as the preparation and management of the nitrate bath, &c., have been well-known and highly appreciated for many years by photographers. In the volume before us we have these various papers revised and systematized, and these, with some entirely new chapters, form an excellent manual of the modern practice of photography. The work has the great merit of being clear, comprehensive, and brief, and therefore easily read, easily remembered, and easily referred to. The following chapter of simple but important and often neglected hints will better assist the reader to appreciate a work which we cordially commend as an admirable book of instructions:—

Attention to the following Rules and Cautions will assist the Operator in the Production of Perfect Pictures.

1. Do not disturb the deposit which will occasionally be found at the bottom of the bottle containing the collodion.

2. Remove all particles of dried film from the neck of the bottle before pouring the collodion on the plate.

3. Never use damp cloths, leathers, or buffs, for giving the final polish to the plate; negatives with an indistinct and muddy surface are frequently produced from this cause.

4. Let the film set properly before immersion in the nitrate of silver bath; its condition can be ascertained by gently touching the lower part of the coated plate with the end of the finger.

5. Never omit to pass a broad camel-hair brush over the plate just before pouring on the collodion.

6. Bear in mind that, as light is the producing agent, so will it prove a destructive one. Not less than four folds of yellow calico should be used to obstruct white light; and in that case the aperture covered should be no larger than is necessary to admit sufficient light for working by. Examine occasionally the yellow calico; when this material is used to exclude white light, it becomes bleached by constant exposure. Do not trust alone to any coloured glass; no glass yet made is adi-actinic under all aspects of light and conditions of exposure.

7. When the negative requires intensifying, carefully wash off all traces of the first developing solution before proceeding to intensify. This operation may be performed either before or after the iodide is removed by fixing.

8. Glass baths are preferable to porcelain, ebonite, or gutta-percha baths for solution of nitrate of silver.

9. In using either spirit or amber varnish, before pouring it off, keep the plate horizontal a few seconds; this gives time for soaking in, and prevents the formation of a dull surface arising from too thin a coating.

10. Rub the lenses occasionally with a soft and clean wash leather; the rapidity of action is much influenced by the brightness of the lenses; their surfaces are constantly affected by moisture in the atmosphere, which, condensing, destroys the brilliancy of the image.

11. The white blotting-paper used for some photographic purposes is not suitable for filtering solutions; that only should be employed which is made for this purpose, and is sold under the name of filtering paper.

12. *Hyposulphite of Soda.*—A great deal of rubbish is sold under the name of this salt; as a test of its quality, 1½ drachms should entirely dissolve in 1 drachm of water, and this solution should dissolve rather more than 4½ grains of iodide of silver.

13. *Chemicals.*—The purity of photographic chemicals cannot be too strongly urged: the cheapest are not always the most economical. The commercial preparations are generally not to be depended upon, as these, though perhaps unadulterated, are, strictly speaking, not chemically pure. It is best to procure them from well-known chemists, who understand the purpose for which they are intended, and make the preparation of these substances peculiarly a branch of their business.

14. Never leave chemical solutions exposed in dishes; when done with, pour them back into glass-stoppered bottles, and decant for use from any deposit, or filter if necessary.

15. In all photographic processes it is absolutely necessary to be chemically clean; and this sometimes is not easy; as a rule, never be satisfied with cleanly appearances only, but take such measures as shall ensure the absence of all extraneous matter in preparing the solutions, cleaning the glasses, dishes, &c.

16. All stains on the hands, linen, &c., may be removed by means of cyanogen soap, or cyanide of potassium, which should be applied without water at first, then thoroughly washed off. To assist the operation, the hands may be now gently rubbed with a fine piece of pumice-stone, when the stains quickly disappear.

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ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

Photography for Artists—The Dublin Medal—The Society Medals—Mr. Wallis's Lecture—Shall Photographs be True or False?—Pinholes in Negatives—Mr. Rejlander's Latest Productions—The Societies.

Mr. Durham too seldom speaks at the meetings of the Photographic Society; but when he has anything to say he always commands the attention of the members. His frank and manly speech at the last meeting, in which he acknowledged his own indebtedness and that of sculptors and painters generally to photography, was a fine tribute from a great sculptor to our art, and one that was thoroughly appreciated by his hearers. It is well known that photographs are much more generally employed by painters to aid them in their drawing, and to shorten their labours, than they are willing to acknowledge. Why they should maintain this reticence has often puzzled me. One of their ostensible reasons is, that if the dealers knew they had any means of producing their effects by an easier process than that usually employed, they would not obtain so high a price for their works. This argument, I fancy, would scarcely bear looking into; but it is a fact that the greatest artists acknowledge the use photography is to them, while the lower ranks ignore it altogether. The following curious extract from Leslie's "Autobiographical Recollections" will show that Chantrey used the best substitute for photography the science of his time would afford. It will be seen that a head-rest is not merely a photographic invention:—

> *July* 31*st*, 1836.—In the evening I went to Mr. Dunlop's. Mr. Dunlop had been sitting to Chantrey, who fixed the back of his head in a wooden machine, to keep him perfectly still, and then drew with a camera lucida the profile and front face of the size of life. He afterwards gave a little light and shade to the drawings, and said, "I shall not require you to sit still after this." He said, "I always determine in my mind the expression to be given, and unless I can see the face distinctly, and with that expression when I close my eyes, I can do nothing. If I can, I can often make the face more like in the absence of the sitter than in his presence."

Had Chantrey lived in our day he would never have commenced a bust until he had obtained a satisfactory photograph or photographs of his sitter for his guidance.

The Dublin medal has been at length issued, and is a capital specimen of the medallist's art. The obverse is a finely modelled figure of Peace showering her blessings from her cornucopiæ on the emblems of Art and Commerce. The reverse has a wreath of bays entwined with a ribbon containing the names of the four quarters of the globe, within which is engraved the name of the recipient and the number of the class in which he exhibited, surmounted by the crown and Irish harp, and the rose, shamrock, and thistle. The medallist is Geefs, of Brussels. It would have been gratifying if the medal of the Irish International Exhibition had been the production of an Irishman. Surely Ireland contains artists equal to the task.

The report of the Council of the Photographic Society contains the satisfactory announcement that the medal of the Society, of which three years' awards are due to exhibitors, is nearly ready for distribution, and a soft metal copy was shown to the meeting. It is also announced that Mr. Durham has kindly consented to execute, and will present to the Society, a medallion portrait of the Lord Chief Baron, President of the Society, and that from this will be produced another die from which impressions will be struck, to be called "The President's Medal," destined for such purposes towards the advancement of the art as the Council shall think fit. This medal—partly because it will have the portrait of the venerable and popular President, and partly because it will be more difficult to obtain than other awards offered to photographers—will be highly prized by its fortunate recipients. It will be remembered that this medal originated with the judges of the last Exhibition of the Society, who, not knowing how better to mark their appreciation of Mr. Wharton Simpson's discovery—the collodio-chloride process—recommended its institution, and that the first impression should be presented to that gentleman.

There are some inventions which strike us as being more wonderful for their simplicity than the most complicated arrangements that could be suggested by the inventor's imagination. Mr. Wallis's lecture on "Elementary Art," delivered at the last meeting of the South London Society, had just this effect on many of his hearers. Too many photographers have been trying to run before they could walk, and have neglected to learn the few simple rules upon which all art is based; rules without which the greatest geniuses would feel crippled instead of the reverse; rules which have been observed from the time when representation emerged from the mere traces of form, and became *art;* rules which guided the hands of Michael Angelo in the realization of his grandest imaginings, and of Raphael in every line he drew; rules, without a knowledge of which no man, whether he use pencil, chisel, or camera, should call himself an artist. These rules, after all, are so simple, so easily learned, that it is wonderful to me that photographers do not give more attention to them. If they did not cause them to add beauties to their pictures, they would at least prevent them committing many absurdities of which they are now guilty. It has been asked, "What do the great artists care about rules? Their genius carries them above such trammels." But such is not the fact. A great artist adds a knowledge of fundamental rules to his other powers; and the more power he has, the greater use he makes of rules, and the less he shows that he has done so.

"Ars est celare artem."

In alluding to this subject, I cannot do better than impress on my readers the following often-quoted passage from "Burnett on Composition":—

> Concealing the art is one of its greatest beauties; and he best can accomplish that who can discover it under all its disguises. I ought, however, to caution the young artist on this head not to be too fastidious in trying to conceal what can be obvious only to a small number; for, in endeavouring to render his design more intricate, he may destroy character, simplicity, and breadth—qualities which affect and are appreciated by every one.

Although I did not quite agree with Mr. Wallis in all that he said (when he recommended the background of dark clouds with a dash of lurid light in the impossible horizon, so often used by Reynolds and his imitators, for instance), I heartily thank him for his endeavour to direct the attention of photographers to first principles.

In the discussion on Mr. Wallis's paper, a question incidentally arose as to whether photographs should be wholly true or partly conventional. One of the speakers argued that the background should not be regarded as a matter of fact at all. This I cannot help thinking is one of the most-seriously-in-the-wrong-direction ideas, and one more likely to lead photographers astray than many we have had from the same quarter for some time. Let art guide the photographer in his representation of nature; but when he neglects or deviates from nature, he sacrifices his own art. Conventional art is an arbitrary mode of representing nature: the more conventional we become, the further we get from the truth; and it is not the function of photography, the most truth-telling of the arts, to be false, even in the rendering of the most subordinate things.

Pinholes in the negative have been a source of vexation to photographers ever since the collodion process was introduced. Many theories of their cause have been suggested, but all wide of the mark until Dr. Vogel, two years ago, demonstrated that they were chiefly formed by minute crystals of iodide of silver floating in the bath, and that the reason of their more frequent appearance during summer than winter was due to the fact that iodide of silver was one of those singular bodies less soluble in warm than in cold solutions. The cause once known, the remedy was obvious. Proper precautions being taken not to over-iodize the bath, there were, however, still pinholes occasionally to be seen, which could not be accounted for by this theory of crystals of iodide of silver. In the last number of the News Dr. Vogel has satisfactorily accounted for these hitherto unexplained pinholes, which he finds are caused by minute particles of sulphate of silver. How they are caused, and how they are to be got rid of, are so clearly stated in his paper, that I need not go into details here.

Mr. Rejlander has been spending a short time in Edinburgh, taking portraits of some of the inhabitants of that city. I have had the pleasure of seeing some of the early proofs of the large number of negatives he took on this occasion, and I have been astonished and delighted with the wonderful results he has produced. Taken under circumstances that would have deterred many photographers from making the attempt—in drawing rooms and in the open air, without the thousand advantages which a well-built studio affords—these pictures, excellent, most of them, as photographs, possess art-qualities which I have never seen in other photographs. One quality especially struck me: every portrait appeared to be the representation of either splendid specimens of men or of beautiful women. We all know that a good model is a great element of success in a portrait; Mr. Rejlander has evidently been greatly blessed in this matter in this instance, but it is evident that the skill of the artist has done much towards bringing out the best points of the sitters upon whom he was fortunate enough to have been called to exercise his genius.

The meeting of the Photographic Society of London was interesting in several particulars. It was the annual meeting, but the Lord Chief Baron, who had promised to preside, was not able, unfortunately, through indisposition, to be present. The election of the new Council was confirmed, and the report of the Council read. One of the best features of the report was the list of papers that had been read during the year. No year that I can remember can boast of such a number of new and important inventions, or such a plethora of useful information as the numerous papers whose titles are mentioned in the report indicated. The subject of the formation of national and local museums of celebrated persons, on which I had something to say in my last, was brought forward by the Chairman, and earnestly advocated by its originator (Mr. M'Lachlan), Mr. Mayall, and others. The subject of most practical interest to the members was the exhibition and explanation by Mr. How of Sarony's Posing Apparatus, which was carefully examined and tested by all who could get near it, and which met with universal approbation.

The North London Association had a magic lantern exhibition and an interesting paper on Photography in the Zoological Gardens by Mr. Frank Haes, some of whose transparencies of the animals are admirable. Mr. Hislop read a paper on Sugar in the Iron Developer, in which he showed that this old addition to the developer has many of the qualities which have been lately claimed for gelatine, in which doctrine many photographers—and I will add myself—will fully agree with him.

To the lecture delivered at the South London Society I have already alluded, and on which, therefore, I need say no more.

The subject of the supposed photographs by Bolton and Watt, of which we had such a large dose at the Photographic Society two years ago, was revived at the last meeting of the Literary and Philosophical Society of Manchester, by papers by Mr. Sidebotham and Mr. Dancer. Mr. Sidebotham appears to have come to the conclusion, from a careful analysis of a portion of one of them, that the surface of the paper was prepared with gum and sugar; on that the image was impressed, consisting of finely divided particles, laid on either in the form of vapour or very fine powder, the picture afterwards receiving an albumen varnish. During the discussion, a letter was read from Mr. Wallis, of the South Kensington Museum, stating that he had given very careful attention to the subject, and that at some future time he intends to make his views known, either in a pamphlet, or as a paper for some scientific journal or society.

At the Edinburgh Photographic Society, Mr. Musgrave read a paper entitled "Failures with the Wet Tannin Process," in which he detailed a number of unsatisfactory experiments. The Chairman (Mr. Davies) said that failures with this process were only what he expected; and other members echoed the remark.

The Glasgow Association had a discussion on the best lens for producing cartes de visite, in the course of which it appeared that lenses by every maker answered well in the hands of some of the speakers, suggesting that there is a great deal in getting accustomed to the use of any instrument, a familiar tool of inferior character sometimes being better liked than the most perfect tool with which the manipulator is unfamiliar.

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ON THE NATURE OF THE CHEMICAL ACTIONS INVOLVED IN THE PRODUCTION AND DEVELOPMENT OF THE PHOTOGRAPHIC PICTURE.

BY NELSON K. CHERRILL.

During the discussion on the new developer, at the London Photographic Society, I remarked that I should have occasion to communicate, through the medium of the Photographic News, some further experiments upon the subject of the paper which I had just read. It would seem, from a remark made by one gentleman, that I did not bring forward enough evidence to make out a good case. My object in this and the following papers will be to show that the suggestion which I then made was not without foundation, but that it is supported by an immense mass of evidence. Before doing this, I wish to devote a short space to the consideration of another and not less important point. I wish to determine, if possible, what is the nature of the chemical or physical change produced by light upon the sensitive surface.

Before suggesting any theory on this subject, I must premise that not only must any proposed theory on such a subject involve no absurdity or contradiction of other observed phenomena, but also it must account for all the recorded experiments on the subject. The theorem, then, which I wish to propose may be stated as follows:—

That the haloid salts of silver are capable of* POLARIZATION *by light, and that in all cases the metallic pole will point towards the direction from which light comes.*

It will be necessary, first, to show that this theorem does not involve any absurdity or contradiction; that is, to show that it is in accordance with other known and established facts; that the state of polarity here spoken of may be assumed; and that, in the second place, this theorem will account for the whole of the phenomena of photography.

Firstly, then—that bodies may assume a state of polarity.

The most obvious and simple cases of polarity (into which I need hardly enter) are those of the magnet and the chain, or wire conducting a stream of electricity. In either of these cases the arrangement of the molecules is the same, as may be represented by the following diagrams, in the magnet.

NS NS NS NS NS, &c., &c.

in which NS represents a molecule having north and south polarity. It will be easily seen from this that wherever you break a magnet, the north pole will always be at one end of the fragment and the south at the other, and that even if you could remove a single molecule of the steel it would still be a perfect magnet, having both north and south polarities; in the case of a wire conducting electricity, the diagram must be merely altered as follows:—

PN PN PN PN PN, &c., &c.,

where PN represents a molecule in the polarized state (P positive, N negative). Now, if we make water a part of an electrical conductor, this state of polarity will have an effect at once interesting and instructive: we may give the following diagram of the result:—

```
&c. PN ¦ PN PN PN PN PN | PN, &c.
       ¦ HO HO HO HO HO |
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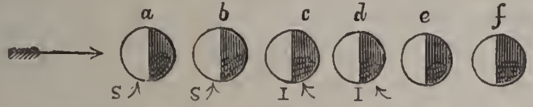
* I have not the least doubt but this might be carried to other salts of silver, and to the haloid salts of many other substances, but the consideration of such a question would be beside the present purpose. In this paper I have made no mention of the chloride of silver, or of any of the printing processes, because I shall have to speak of them at a future time.

By which is meant to be shown that the water (HO) is polarized not only as to its electrical condition, but also its constituent elements are placed in a state of polarity; and under favourable circumstances the hydrogen will be given off at the negative pole, and the oxygen at the positive pole of the battery. And this chemical polarity will be borne out in many other instances, insomuch that, from its power of rendering the atoms of compound bodies in a state of polarity, the electric current is by far the most powerful decomposing agent known.

I have thus endeavoured to show that there is such a state as chemical polarity; that is, that compound bodies may be made to assume, under certain circumstances, that state; and therefore I propose that, to account for the action of light upon sensitive surfaces, we adopt the theorem before given, viz., that the haloid salts of silver are capable of polarization by light.

Before proceeding to show how this will account for the phenomena displayed by photography, I may observe that no objection to this theory can be raised on the ground that no such phenomenon has been observed, or that phenomena of this kind are confined to the action of electricity and magnetism, because such an answer would suggest that we are already acquainted with the nature of the actions involved. Nor can it be urged, with any reason, that the chemical polarity, even if produced by light, must cease the moment the light is removed, in the same way that the polarity of water ceases when the current of electricity is broken. There is a case in which electricity may induce polarity, which remains permanent, viz., electro-magnetism; and it is no small argument in favour of this theory of the polarization of the salts in the film, that, under certain circumstances, the action does gradually cease, and that just in the same way as the polarity of a badly-tempered magnet ceases, by very slow degrees.

In order to see the application of the theorem which I have above propounded, the following diagram will be necessary:—



The circles *a b c d*, &c., are supposed to represent molecules of iodide of silver; the direction of the ray of light is shown by the arrow. All that I would maintain is, that these molecules are polarized, as shown in the diagram, by the action of light, and that the silver of each would form the pole pointing towards the arrow. I am quite aware of the difficulty of proving absolutely that this is the action of light on the substance in question; but I will give a few experiments in favour of the suggestion, and then go on to show how the usual phenomena of photography may be accounted for, granting its truth.

The first thing that strikes us in regard to the supposed polar state of the salts, is, that, under proper circumstances, it would be very easy to destroy or neutralize their polarity. To test the truth of this, I prepared a plate as usual, and exposed it in the camera to a landscape. I then took it into the dark room, and washed away all the free nitrate of silver. I then flowed over the plate a solution of iodine and iodide of potassium, and instantly deluged the plate with water; the iodine, &c., was only on the film about two or three seconds. I then continued the washing most carefully. By this proceeding (according to my theorem) I should resolve the polarity of the topmost molecule (*a*) in every part of the exposed plate; doing this would be, in every sense of the word, to neutralize the whole effect of polarization throughout the film.*

I then took this washed plate, and tried the effect of a developing solution, which was, of course, *nil*. I endeavoured to obtain an image by using hot water and a very large addition of silver (nitrate) to the developer, but all to no purpose; I could not get a trace of a picture. I now washed off the developer with warm water for several minutes, and then flowed the plate with some silver solution from the bath, placed it again in the dark slide, and exposed it to a totally different view, and on again pouring on the developer, the second picture came out with ease and considerable distinctness, but not a trace of the first picture was to be seen.* This, then, would seem to show that, having destroyed the polarity in the first instance, by the use of iodine, &c., the plate could be used again as if new from the bath—that is, could be made to assume a new state of polarity.

(To be continued.)

THE EXCISE AND PHOTOGRAPHY.

(COMMUNICATED).

It is not generally known that the exciseman has any right to interfere with the operations of photographers or the sale of photographic requisites. Such, however, is the case.

About two years ago, an active supervisor discovered a small copper still—not more than one gallon—exposed for sale in the shop window of Mr. Jabez Hughes, Oxford Street, London. The active officer entered the shop and inquired if a licence had been obtained to allow stills to be sold? As the seller did not use them, nor did the buyers use them for anything but distilling water, it was not thought necessary, and an answer in the negative was given. After a good deal of bother and trouble, caused by having to appeal to the heads of departments at Somerset House, it was finally settled that a licence must be taken out to allow anyone to use or sell a still. Well, it was done; but the odd part of the matter was, that no other dealer in London was interfered with, which was somewhat unjust, for it was practically placing that one house under a disadvantage in the sale of stills.

Now another house, Messrs. Horne and Thornthwaite's, has been pounced upon for selling alcohol without a licence, and the mode of procedure was this. An excise officer bought some strong alcohols of Messrs. Horne and Thornthwaite, and then laid an information against them. Thereupon Messrs. Horne and Thornthwaite laid the whole matter before the Board of Inland Revenue, and explained that the alcohol they sold was for scientific purposes, and did not come within the Act of Parliament, as it was too strong to be tested by the Government standard, which is Syke's hydrometer. The reply of the Commissioners was to the effect that the law absolutely prohibits the sale of any spirits without a licence, but that the department was not in the habit of interfering with chemists who sell small quantities of highly rectified spirits for medical or scientific purposes. The spirit so sold, however, was not to be under 60° overproof, and in quantities of not more than one gallon at a time. This settles the question regarding pure absolute alcohol; but the sale of *methylated* alcohol of any strength can only be permitted by having a licence. The matter was finally arranged by Messrs. Horne and Thornthwaite taking out a licence to sell methylated spirits, and this settled the case for other houses in the trade. And the only houses who can, at present, so far as we know, legally supply photographers with that necessary article, methylated alcohol, are Messrs. Horne and Thornthwaite, Mr. Jabez Hughes, Mr. F. J. Cox, and Messrs. T. Ordish and Co.

RAMBLES AMONG THE STUDIOS OF AMERICA

BOSTON.

BY J. WERGE.

My impressions of America, from a photographic point of observation, were taken at two distinct periods—which I might call the two epochs of photographic history—the dry and the wet; the first being the Daguerreotype, and the second what may be termed the present era of photography, which includes the processes now known and practised.

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* It is a fact well known, that if you destroy the polarity of the atoms at one end of a small magnet by the inductive action of a larger one, the whole of the polarity of the small magnet will be neutralized; this is, of course, only an analogous case, but it may serve to illustrate the present position, which is, that if, by the action of any disturbing element, such as iodine, we destroy the polarity of the first molecule, the polarity of the whole film will be destroyed.

* I have, since writing the above, tried the experiment reversed; that is, I have taken a picture on the wrong side of the film, in which case I find that an application of iodine, as above, will not remove every trace of an image from the film, though of course this experiment might be thought ambiguous. The whole result is easily accounted for by the theorem which I have proposed, and, as far as it goes to prove anything, it goes to prove the truth of that theorem.

I take Boston as my starting point for several reasons. First, because it was the first American city I visited; secondly, it was in Boston that the change first came over photography which wrought such a revolution in the art all over the United States; thirdly and severally, in Boston I noticed many things in connexion with photography which differed widely from what I had known and practised in England.

Arriving in Boston after a long, tedious, and eventful voyage across the Atlantic, I spent the first few days in rest and looking about the somewhat quaint and interesting old city, hunting up Franklin associations and revolutionary landmarks, Bunker Hill and other places of interest. Having satisfied my appetite for these things, I began to look about me photographically, and visiting the gallery of Mr. Whipple, then in Washington Street, the busiest thoroughfare in Boston, I was struck with the very large collection of Daguerreotype portraits there exhibited, but particularly with a large display of Daguerreotypes of the moon in various aspects. I had heard of Mr. Whipple's success in Daguerreotyping the moon before I left Europe, but had no idea that so much had been achieved in lunar photography at that early date until I saw Mr. Whipple's case of photographs of the moon in many phases. Those Daguerreotypes were remarkable for their sharpness and delicacy, and the many trying conditions under which they were taken. They were all obtained at Cambridge College under the superintendance of Professor Bond, but in what manner I had better allow Mr. Whipple to speak for himself, by making an extract from a letter of his, published in *The Photographic Art Journal* of America, July, 1853. Mr. Whipple says: "My first attempt at Daguerreotyping the moon was with a reflecting telescope; the mirror was five feet focus, and seven inches diameter. By putting the prepared plate directly in the focus of the reflector, and giving it an exposure of from three to five seconds, I obtained quite distinct impressions; but owing to the smallness of the image, which was only about five-eighths of an inch in diameter, and the want of clockwork to regulate the motion of the telescope, the results were very far from satisfactory.

"Having obtained permission of Professor Bond to use the large Cambridge reflector for that purpose, I renewed my experiments with high hopes of success, but soon found it no easy matter to obtain a clear, well-defined, beautiful Daguerreotype of the moon. Nothing could be more interesting than its appearance through that *magnificent* instrument; but to transfer it to the silver plate, to make something tangible of it, was quite a different thing. The "governor," that regulates the motion of the telescope, although sufficiently accurate for observing purposes, was entirely unsuitable for Daguerreotyping; as when the plate is exposed to the moon's image, if the instrument does not follow exactly to counteract the earth's motion, even to the nicety of a hair's-breadth, the beauty of the impression is much injured, or entirely spoiled. The governor had a tendency to move the instrument a little too fast, then to fall slightly behind. By closely noticing its motion, and by exposing my plates those few seconds that it exactly followed, between the accelerated and retarded motion, I might obtain one or two perfect proofs in the trial of a dozen plates, other things being right. But a more serious obstacle to my success was the usual state of the atmosphere in the locality—the sea breeze, the hot and cold air commingling, although its effects were not visible to the eye; but when the moon was viewed through the telescope it had the same appearance as objects when seen through the heated air from a chimney, in a constant tremor, precluding the possibility of successful Daguerreotyping. This state of the atmosphere often continued week after week in a greater or less degree, so that an evening of perfect quiet was hailed with the greatest delight. After oft-repeated failures, I finally obtained the Daguerreotype from which the crystallotypes I send for your journal were copies; it was taken in March, 1851. The object glass only of the telescope was used. It is fifteen inches in diameter, and about twenty-three feet focal length; the image it gives of the moon varies but little from three inches, and the prepared plate had an exposure of thirteen seconds."

Copies of several of these "crystallotypes" of the moon I afterwards obtained and exhibited at the Photographic Exhibition in connexion with the British Association which met in Glasgow in 1855. The "crystallotypes" were simply enlarged photographs, about eight or nine inches in diameter, and conveyed to the mind an excellent idea of the moon's surface. The orange-like form and the principal craters were distinctly marked. Indeed, so much were they admired as portraits of the moon, that one of the *savans* bought the set at the close of the exhibition.

The gallery of Mr. Whipple contained many other novelties in connexion with photography at that period. The successful practice of the Daguerreotype art greatly depended on the cleanness and highly polished surface of the silver plates. To secure those necessary conditions, Mr. Whipple had, with characteristic and Yankee-like ingenuity, obtained the assistance of a steam engine, which not only "drove" all the circular "cleaning" and "buffing" wheels, but an immense circular fan, to keep the operating room cool as well; and the "sitters," while waiting to be taken, or during the intervals of sitting, in the hot sultry days of summer, were kept "beautifully cool," and in good humour with themselves—another important "help" to Mr. Whipple, enabling him to catch many an "agreeable expression" not to be got otherwise.

Machinery and ingenuity did a great many things in Mr. Whipple's establishment in the early days of photography. Long before the "ambrotype" days, pictures were taken on glass, and thrown upon canvas by means of the oxyhydrogen light, for the benefit of *artists*, who sketched the proportions of the subject from the shadow on the canvas, and painted from the photograph, filling in the light and shade at their leisure in their studios.

Mr. Whipple was the first American photographer who saw the great commercial advantages of the collodion process over the Daguerreotype, and he engrafted it on his Daguerreotype business almost as soon as it was introduced. Indeed, Mr. Whipple's establishment may be considered the very cradle of American photography, as far as collodion negatives and silver prints are concerned, for he was the very first to take hold of it with spirit, and as early as 1853 he was doing a large business in photographs and teaching the art to others.

In 1853 he took his active and intelligent assistant, Mr. Black, into partnership, who photographed the statues of Christ and his Apostles, by Thorwaldsen, and other beautiful statues and objects of art in the "World's Fair" at New York, and made a tour through the "States," imparting a knowledge of the then infant art to all who were alive to its beauties and importance.

At that early period of the history of photography, Mr. Whipple did an immense "printing and publishing" trade, and his printing facilities at that time were "something considerable." His toning and washing troughs were almost worthy the name of "vats," if the size of the articles were to be a guide to their nomenclature. Mr. Whipple is still a successful practitioner of our delightful art in the "Athens of the Western World," and has reaped the reward of his continuity and devotion to his favourite art. The late decision of the American law courts on the validity of Mr. Cutting's patent for the use of bromides in collodion must have laid Mr. Whipple under serious liabilities, for he used bromo-iodized negative collodion for iron development as far back as 1853.

Messrs. Masury and Silsby were also early producers of photographs in Boston, and in 1854 employed a very clever operator, Mr. Turner, who obtained beautiful and brilliant negatives by iron development. One of the gentlemen of this firm was the earliest victim I knew to the risks of making oxygen gas for enlarging photographs. He was not killed, but very seriously injured by an explosion while making some gas in 1854.

Messrs. Southworth and Hawes had also a large Daguerreotype establishment in Boston, and did an excellent business. In their "saloon" I saw one of the largest and finest revolving stereoscopes that ever was made. The pictures were all taken on whole-plates, and set vertically on the perpendicular drum on which they revolved. The drum was turned by a handle attached to cog wheels, so that a person sitting before it could see its contents with the greatest ease in an upright position. It was an expensive instrument, but it answered the double purpose of beguiling the time of a "sitter" while waiting, and being a capital advertisement as well, for many went to see it out of curiosity alone.

There were many other professional photographers in the chief city of Massachusets; but I have described the characteristics of the principal and oldest concerns. Doubtless there are many new ones since I visited the city where Benjamin Franklin served his apprenticeship as a printer; where the "colonists" in 1773, rather than pay the obnoxious "tea tax," pitched all the tea out of the ships into the waters of Boston Bay, and commenced that long struggle against oppression and unjust taxation which eventually ended in severing the North American Colonies from the mother country. With the knowledge of all this, it is the more surprising that they should now so quietly submit to what must be an obnoxious and troublesome system of taxation. For, not only have photographers to pay an annual licence of about two guineas for carrying on their trade, but also to affix a government stamp on each picture sent out, which is a further tax of about one penny on each. Surely the patience of our brother photographers on the other side of the Atlantic must be sorely tried, what with the troubles of their business, the whims and eccentricities of their sitters, Mr. Cutting's unkind cut, and the prowling visitations of the tax-collector.

PHOTOGRAPHY IN THE COUNTY COURT.

[We have received the following from a correspondent. Another correspondent, writing on the same subject, explains that the photographer who produced the pictures was a skilful man, but had not got his studio erected. The case, which will interest many of our readers, suggests the desirability in all cases of the photographer endeavouring to please his sitter before demanding payment. A tailor brought an action some time ago against Sir Edwin Landseer for the price of a coat. The plea on which payment was resisted was that the coat did not fit. This plea was admitted as satisfactory, and the action was decided in favour of Sir Edwin. Without comparing portraiture and coat making, the question of fitting and likeness are sufficiently similar to suggest the operation of a similar legal decision in each case.]

County Court cases are for the most part very dull affairs, tally and chandler shop bills comprising the major part of the various points in dispute. A week or so back the Falmouth County Court (C. D. Bevan, Esq., Judge) had its usual duliness broken in upon by a picture case (or, as the Cornish people call it, a "*picter plaint*)," in which one Charles Knight, a photographic artist, of Killigrew Street, summoned Miss Annie Trewartha, who had refused to pay 4s. 6d. for three portraits which the said Charles Knight had taken of her. On the young lady being called on for her reason for not paying, she handed the three cards to the Judge, at the same time remarking:

"Did your Honour ever see such frights?"

The Judge, on looking at the specimens, and then comparing them with the lady, said they were certainly very indifferent as works of art, and by no means flattering as portraits: when the young lady again exclaimed:

"Flattering, Sir! They are frightful."

The pictures were then handed round, and caused much amusement by the various remarks made; Mr. T. H Tilly, solicitor, remarking they were as rough a lot as possibly could be, surrounded with specks and stains; and observed that the lady appeared as if taken in a shower of cinders. The clerk of the court here said they were evidently *vesuvians*, not photographs, from the great eruption going on in the background.

This and much more went on for some time, to the great amusement of all present save the photographer. The Judge here intimated that from the portraits being so badly taken, the lady's liability to pay for them was out of the question, at the same time suggesting that she had better sit again, and allow the artist to accomplish the work in a more satisfactory manner. The lady now handed in a nicely executed carte picture taken of her elsewhere. This was much admired. She then stated that after waiting for more than an hour at the plaintiff's, she was taken out into a back garden, and requested to be seated on an old kitchen chair, with a blanket nailed up to the wall for a background.

The photographer here remarked that he was about to put up a glass house; when the Judge good-humouredly advised the young lady to wait for a few weeks till the studio was ready, and be taken again; as with the improved appliances the artist might be more successful, and do her good looks full justice. Thus ended the case, which caused a large amount of amusement in court.

Recent Patents.

TESTING FOR HYPOSULPHITE, &c.

BY THEODOR REISSIG.

This specification received provisional protection only. The object was to provide for a means of securing perfect washing of prints by a washing machine in which the washing water would be thrown off by centrifugal force, on a similar principle to Mr. Grisdale's patent machine; and to provide a delicate test to ascertain if all traces of hyposulphite were eliminated from the print. The subject was noticed in our last volume. The specification, which is brief, is as follows:—

This invention relates, firstly, to a test whereby the operator is enabled to determine whether hyposulphite of soda or other such fixing agent has been removed by washing or other process employed in the practice of photography. With this view he places the prints after they have been washed, or otherwise similarly treated, or the fluid in which they have been washed, in communication with the poles of a galvanic battery, by which means the fixing agent becomes decomposed, and sulphur (if the fixing agent above mentioned has been used) appears at the negative pole. If silver be employed for this pole the effect is more apparent. As this part of the invention depends upon the elimination of the injurious part of the fixing agent, it is evident that it may be used for the removal of the last traces or of larger quantities.

Secondly, the invention relates to a mechanical method of removing the said fixing agents. For this purpose the photographs are caused to rotate at a considerable velocity, so as to throw off the liquid they contain by centrifugal force. The apparatus proposed to be employed is a folding frame, covered with latticework, and within which the photographs are placed and then confined. This framework or cage is mounted upon a spindle, which is caused to revolve rapidly by a winch handle, or other ordinary means.

The two parts of the invention may be combined, the test of the former being applied between successive washings and operations of the centrifugal apparatus.

IMPROVEMENTS IN PHOTO-LITHOGRAPHIC TRANSFERS.

BY C. M. TESSIE DU MOTAY AND C. R. MARECHAL.

The object and details of this invention are stated, in the specification, as follows:—

The reducing action exercised by light upon neutral chromates and alkaline bichromates mixed with solutions of gelatine, albumen, and other analogous organic substances has been and still is applied to the production of photographic images inkable by fatty inks, by the means employed by lithographers and engravers, but the photographs hitherto produced are far from perfect. The inventors have sought to discover—

1st. Whether, on the one hand, chromic acid salts more acid and more complex than protochromates and bichromates, and consequently more easily decomposable by light, and whether, on the other hand, bodies more capable of reducing the oxygen of the chromates than gelatinous and albumenous solutions, and others of the same class, added to the said solutions, could not help the light to transform more completely the salts of chromic acid to the state of chromate of chromium, and thereby communicate to photographic proofs thus generated a more complete affinity for fatty bodies intended to ink them.

2nd. Whether soaps of silver spread over gelatinous, albumenous, gummy, and other analogous coatings containing salts of chromic acids, would not favour the ulterior inking of photographic images, by being decomposed by light at the same time as the chromic compounds of the underlaying coatings. The following are the results, and the invention consists in the processes hereinafter described.

Alkaline trichromates mixed with a solution of gelatine and other substances in the same chemical group, to which have been simultaneously added gums, acids, or salts having great affinity for oxygen, such as formic, gallic, pyrogallic, and tartaric acids, and soluble salts formed by the same acids, either inorganic salts, also having affinity for oxygen, such as hyposulphites, sulphites, bisulphites, hypophosphates, and phosphates, have been rapidly reduced by light, and so completely that the photographic images generated by them have acquired such an affinity for fatty bodies, and such a porosity for water, that these same images have reproduced, by inking, the slightest demi-tints of the originals.

2nd. Bichromate of ammonia and of bichloride of mercury, bicarbonate of potass and of bichloride of mercury, bichromate of soda and of bichloride of mercury, trichromate of potass and of bichloride of mercury, and trichromate of soda and of bichloride of mercury, used either pure or mixed with alkaline protochromates, bichromates, and trichromates, with or without the addition of bodies having affinity for oxygen, and added to gelatinous and other similar organic solutions, have all yielded upon paper, cardboard, stone, glass, and ceramic ware, positive images completely reduced and inkable by fatty inks, after the fashion of lithographers, with a roller or pad.

3rd. The chromo-alkalino-mercurial salts above mentioned, dissolved and added to gelatinous solutions, spread in thin layers upon sheets of zinc, copper, cast iron, steel, and other metal, then impressed by light, yield, after prolonged washings by water, images very well reduced and very adhering, but inkable negatively, whence it follows that to obtain images inkable positively it is necessary to employ positive plates. This result, the inverse of that obtained with the same salts upon paper, cardboard, wood, stone, and ceramic ware, is completely new. It is explainable, however, on the one hand, by the doubly reducing action of light upon the bichloride of mercury, and upon the chromic acid of the chromates; and on the other hand, by the action of the metals decomposed in presence of water; the salts of mercury in all parts where the light has not acted has not restored to the state of insoluble protochloride the bichloride combined with the bichromates or the trichromates mixed with the gelatinous layers.

4th. Layers of gelatine, albumen, gum, and the like, with the addition of one or other of the chromic acid salts before named, and deposited upon paper, card, wood, stone, glass, ceramic ware, or upon metal, having been covered after dessication with layers of argentic soaps, then subjected to luminous action, two superposed images are produced, one resulting from the decomposition of the soaps of silver, the other from the reduction of the chromates by the simultaneous effect of light. These superposed images having been afterwards washed with cold water, and then with warm water, and subsequently inked by the roller or pad, became covered with fatty inks adhesive in all parts where the light had acted.

The proportions in which the chemicals are mixed are as follows:—I add to a solution of gelatine (or other analogous chemical composition) containing 100 parts of gelatine, a saturated solution of potassic trichromate at 25° Beaumé, and containing about 15 per cent. of trichromate, and from about 12 to 20 per cent. of the other salts of chromium and of mercury herein before specified when the said salts are used. To this first mixture are added from 20 to 30 drops of one of the reducing agents before described, together with 3 to 5 per cent. of gum or other analogous substance. These mixtures and proportions may, however, be varied; for example, the proportions of the salts of chromium and of the gum may be increased or diminished according to the seasons and to the intensity of the images to be obtained.

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ARAGO'S PLAN FOR PROVING THE TRUE THEORY OF LIGHT.

Among the papers published in the Smithsonian Report is a translation by Alfred M. Mayer, Professor of Physics, Pennsylvania College, Gettysburg, of a very clear essay on the velocity of light, by M. Delaunay, of the Institute of France. From this translation we extract the following account of the plan proposed by M. Arago for determining experimentally the long disputed question whether light is an emission or an undulation. Arago's eyesight being impaired, he was unable to try the experiment himself, but in 1850 the trial was made by M. Foucault, also by MM. Fijeau and Bregnet, these *gentlemen* having first obtained the assent of Arago, before proceeding with an experiment suggested by him.

The first step in this direction was the most difficult to make, and it required all the daring of genius to attempt it. We find it in an experiment projected by Arago, and communicated to the Academy of Sciences of Paris during its meeting on the 3rd of December, 1838. In the project it was not as yet proposed to measure the velocity of light, but simply to compare the velocities with which light moves in air, or in a liquid such as water, or bisulphide of carbon; it was proposed to find by experiment which of these two velocities was the greater, which would decide in an irrefutable manner between the two systems imagined by physicists to explain optical phenomena, viz., the system of emission and that of vibration or undulation. We cannot do better than here allow Arago to speak for himself. The following is what he says in the notice printed in the Proceedings of the meeting:—

"I propose to show in this communication how it is possible to decide, unequivocally, whether light be composed of little particles emanating from radiating bodies, as Newton supposes, and as the greater part of modern geometers admit; or whether it is simply the result of the undulations of a very rare and very elastic medium which physicists have agreed to call *ether*. The system of experiments which I am about to describe will no longer permit, it seems to me, to hesitate between these two rival theories. It will decide *mathematically* (I use designedly this expression)—it will decide mathematically one of the grandest and most debated questions of natural philosophy.

"Besides, my communication is the fulfilling of a sort of engagement to the Academy I accepted at one of its last secret sittings.

"I discussed the admirable method by the aid of which Mr. Wheatstone attempted the solution of the problem of the velocity of electricity over metallic conductors. I had hardly terminated the enumeration of the important results obtained by that ingenious physicist, when several of our members, whose names are authority in such matters, stated that my report was far too approbative. 'In supposing it well determined, the inferior limit assigned by Mr. Wheatstone to the velocity of electricity will not have,' said one, 'any marked influence on the progress of the sciences; besides, limits of the same order, and even more extensive, can be deduced indirectly from various electric or magnetic phenomena. As to the method of the revolving mirrors, it does not seem to be susceptible of application, but to the simple questions already studied by the inventor.' I tried to refute this last opinion. I believe myself, that the new instrument, suitably modified, would lead to results that Mr. Wheatstone was not aware of. I already foresaw that, even in supposing it enclosed in the narrow limits of a small room, it could serve to measure the comparative velocities of light moving through air and through a liquid. I was not slow in learning, and without having hardly the right to be astonised or to complain that my assertions had been received with incredulity. Nevertheless, I intend to vindicate it to-day in all its parts.

"*Principle of the Method.*—Let a ray of light fall upon a plane polished mirror; it will be reflected, as every one knows, in forming with the surface of the mirror an angle of reflection exactly equal to the angle of incidence.

"Let us now suppose that the mirror turns through an arc, a, around the point of its surface from which the reflection takes place. If this motion, for example, increases the quantity, a, *the original angle of incidence*, it will diminish as much *the original angle of reflection.* The latter will, therefore, after the displacement of the mirror, be smaller than the first by the quantity $2a$; thus it must be increased $2a$ to render it equal to *the new angle of incidence;* hence that angle increased $2a$ will give the direction of the reflected ray in the second position of the mirror; and thus the incident ray remaining the same, an angular motion, a, of the mirror occasions a *double* angular motion in the reflected ray.

"This mode of reasoning applies as well to the case where the motion of the mirror, acting in a contrary direction, would *diminish* the first angle of incidence. The principle is, therefore, general; and it is also that of all reflecting nautical instruments.

"The reflection from the plane mirrors can serve to project the luminous rays in all parts of space, without, however, altering the relative positions; two rays parallel before reflection; those at first inclined to each other 1 minute, 10 minutes, or 20 minutes, &c., will form precisely the same angle after the reflection has deviated them.

"Instead of a single ray, let us consider two horizontal rays setting out from *two neighbouring* points situated in the same vertical. Admit that they strike on two points of the median line (also vertical) of a plane vertical mirror. Suppose that this mirror revolves on itself uniformly and in a continuous manner around a vertical axis whose prolongation coincides with the median line just mentioned, the direction in which the two horizontal lines will be reflected will depend evidently upon the moment they may reach the mirror, since we have supposed that it turns. If the *two rays* have *set out simultaneously from the two contiguous points*, they will also reach simultaneously by the mirror. Their reflection will take place at the *same instant;* consequently in the same position of the turning surface; consequently as if that surface was stationary with respect to them. Therefore their primitive parallelism will not be changed.

"In order that the rays which primitively were parallel may diverge after their reflection, it is necessary that one of them should arrive at the mirror later than the other. It is necessary that in its course from the radiating point to the reflecting and turning surface, the velocity of the ray should be accelerated, or, what will be precisely the same thing, it is necessary (the velocity of the first ray remaining constant) that that of the second should experience a diminution. It is necessary, finally, that the two rays should be reflected one after the other; and, consequently, from two distinct positions of the mirror, forming with each other a sensible angle.

"According to the theory of emission, light moves in water notably faster than in air. According to the wave theory, it is precisely the opposite which takes place: the light moves faster in air than in water. Suppose that one of the rays (the upper ray, for example) has to traverse a tube filled with water before it strikes the mirror. If the theory of emission be true, the upper ray will be accelerated in its progress; it will reach the mirror first; it will be reflected before the lower ray; it will make with it a certain angle, and the direction of the deviation will be such that the lower ray will appear in advance of the other, that it will appear to have been deviated more by the turning mirror.

"Circumstances remaining the same, let us admit for a moment the truth of the wave system. The tube of water will retard the progress of the upper ray; the ray will arrive at the reflecting mirror after the lower ray; it will be reflected, not the first, as in the former case, but the second in order, and from a position of the polished reflecting face in advance of the position it had when it reflected the upper ray a moment before: these two rays will make with each other the same angle as in the other hypothesis, except (and we should well remark it) the deviation will take place precisely in an opposite direction; the upper ray will now be in advance, always indicating thus the direction in which the mirror revolves.

"To recapitulate: two radiating points, placed near each other on the same vertical line, flash instantaneously before a revolving mirror. The rays from the upper point cannot reach the mirror until after traversing a tube filled with water; the rays from the second point arrive at the mirror without meeting in their course any other medium than air. To be more definite, we will suppose that the mirror, seen from the position the observer occupies, turns from the right to the left. Well, if the theory of emission be true—if light be material—the upper point will *appear to the left* of the lower point. *It will appear to the right* on the contrary, if light results from the vibrations of an ethereal medium.

"Instead of two isolated radiating points, suppose that we instantaneously present to the mirror a vertical luminous line. The image of the upper part of this line will be formed by rays which have traversed the water; the image of the lower part will result from the rays which have throughout their whole course traversed the air. In the revolving mirror the image of the single line *will appear broken;* it will be composed of *two* vertical luminous lines, of two lines which will not be prolongations of each other.

"The upper rectilinear image, is it behind the one below? Does it appear to the left?

"*Light is a body.*

"Does the contrary take place? The upper image, does it show itself to the right?

"*Light is an undulation.*

"All that precedes is theoretically, or rather speculatively exact. Now (and here is the delicate point), it remains to prove that, notwithstanding the prodigious velocity of light; that notwithstanding a velocity of 190,000 miles a second; that notwithstanding the small length that we will be obliged to give to the tube filled with liquid; that notwithstanding the limited velocities of rotation that the mirrors will have, the comparative deviations of the two images, toward the right or toward the left, of which I have demonstrated the existence, will be perceptible in our instruments."

Arago then enters into the most minute details of all the parts of the experiment—the velocity of rotation that can be given to a mirror, the visibility of the image formed by light after having traversed the necessary length of liquid, the possibility of reducing that length of liquid, or the velocity of rotation of the mirror by employing simultaneously several rotating mirrors from which the light would be successively reflected, and also in substituting for water bisulphide of carbon, which acts more powerfully on the velocity of light, are on his part the object of a thorough examination. He then terminates thus:—

"Suppose, in the experiment that I propose to execute, we make use of electric sparks, or of lights successively screened and unscreened by the use of rotating discs, as their emissions should only last during a few thousandths of a second, it may happen that an observer, looking in the mirror from a given direction, and with a telescope of limited field, will only by chance perceive the light. To this I immediately reply, that in renewing very often the apparitions of light—every second, for example—that if, instead of a single mirror, we rotate a vertical prism of eight or ten facets, that with the concurrence of several observers, placed in different directions, and each with his telescope, we cannot fail to have numerous and clear apparitions of the reflected rays. But these are details on which I shall not dwell to-day. I will reserve for another communication the exposition of the system of experiments in which we will render sensible, and in which we will measure, to a certain degree, the *absolute velocity* of light without having recourse to celestial phenomena."

Before proceeding further in the perusal of the essay of M Delaunay, it is necessary that all who have not given especial attention to the study of recent optical research, and who desire to appreciate the beauty and importance of the remainder of this essay, should understand *why* light should move faster in water than in air according to the emission theory, and slower in water than in air according to the undulatory theory. This is not explained by the author, and without this knowledge it is impossible to appreciate the excellence of these classical experiments of Arago, of Fizeau, and of Foucault.

We would advise the above class of readers to study the points here spoken of in the "Lectures on the Undulatory Theory of Light," by Professor Barnard, Smithsonian Report for 1862. In the admirable "*Traité de Physique,*" by Daguin, Paris, 1862, and in Pouillet's "*Traité de Physique,*" will be found detailed accounts of the apparatus mentioned in this essay, illustrated with engravings. The original memoirs in the Transactions of the Academy of Sciences of Paris should also be continued.—*Scientific American.*

◆

NEGATIVE COLLODION.

A correspondent of *Humphrey's Journal* states that the following formula for negative collodion is used by Poitevin with great success :—

Ether	½ ounce
Alcohol	½ ,,
Cotton	7 grains
Bromide of cadmium	½ grain
Bromide of ammonium	1½ grains
Iodide of cadmium	2½ ,,
Iodide of calcium...	1 grain
Iodide of potassium	1 ,,
Iodide of ammonium	1 ,,

For intensifying, flow with—

Chloride of gold	1 grain
Water	15 ounces.

Then wash and flow with—

Pyrogallic acid	2 grains
Water	3 ounces.

◆

IRREGULAR SPOTS ON THE COLLODION FILM.

BY E. A. KUSEL.*

Having read a good deal in several American and German Journals of Photography, on the cause of the production and avoiding of irregular white spots on a sensitized collodion film after keeping the same a short time, before exposing and developing, I have noticed a great deal of speculation as to how that nuisance is produced, and how it can be best avoided ; but I will give you my experience, and if it should be of any advantage to the fraternity, you may make use of it in any way you please.

Some two years ago, I, like many others, was troubled with white spots and streaks on the films, after removing the same from the bath a short time, and so I set myself to work to overcome that difficulty, in which I succeeded to my satisfaction ; and from that time, knowing the cause, I have had very little or no trouble in doing away with streaks if they appear. Now I will give you the causes.

First cause : the collodion must be ripe, to give a short and somewhat rotten film, and better not to be iodized with the potassium salts, and in no way must the collodion be *over-iodized.* The reason is *obvious,* because a hard and horny film will always have, like an over-iodized collodion, the sensitive part of the film or picture on the top, and can easily be brushed off, when dry. This state of the film will also cause a shrinking of the collodion, and therefore will leave an uneven film on the plate, from which the excess of silver cannot evenly run down, and therefore producing these irregular spots on drying, which could not happen so easily on a soft film, which would and does hold moisture enough to keep the nitrate of silver on the film from crystallization for some time. I have also noticed that the potassium salts are very prone to quick drying and crystallizing, and in leaving a scummy mixture on the drying film ; therefore, if the collodion is too tough, add old rotten collodion, and if over-iodized, add plain old collodion, and never iodize your collodion with *potassium, iodide,* or *bromides,* in such cases.

The second trouble is the bath, which may be the cause of the spots, and I have also noticed that a strong bath, which contains more than from 43 to 45 grains of silver to the ounce of water, is very apt to give spots, and in particular, if the plates are taken out of the solution before the film is perfectly formed ; therefore try your bath. If too strong, take water, and reduce it to 43 grains of silver ; but better still, add about eight ounces of water more, and then put into the bath of about eighty ounces of solution, thirty grains of cyanuret of potassium, and boil it down eight ounces : set the same in bright sunlight for a few days ; after which filter, and if it soils the pictures, drop in a little pure nitric acid, until the pictures are clear. Never use a stronger bath than forty-three grains to the ounce of water ; never take your plate out of the nitrate solution before the iodide and bromide of silver are perfectly formed, and you will have no trouble, even in a temperature like ours, which runs from 80° to 110° Fahrenheit in the summer. The idea of putting a moist rag on the back of the plate, and moistening the slide of the plateholder, is a very good one, and ought not to be omitted, if travelling a great way, and in taking children's pictures in the hot summer months.

I send you, inclosed, a few of my small productions, and would like to have your opinion of them. They are silvered with thirty grains of silver, and fifteen of nitrate of ammonia, and after being well dried I fume the paper on a strong solution of con. ammonia, about two minutes, print, wash in clean water, and then in salt water, and then tone in gold and lime, wash well again, and fix in hyposulphite of soda.

I also am able to give a developer which, I think, is original, and which I in general use for taking children's pictures ; it works well, and will bring out the picture, if no other will do so.

Sul. quinine	20 grains
Sul. of iron	½ ounce
Water	8 ,,

Dissolve the quinine in as little sulphuric acid as possible. Dissolve the iron in the water, and filter into the dissolved quinine ; if a few days old, it is better. No alcohol is needed, and works very even, and gives good intensity and details.

◆

BARIUM IN PRINTING.*

We have received the following from a New Orleans correspondent, which seems a very plausible process. We have not been able to experiment with it on account of a press of other work, but, with our correspondent, hope that others will do so, and apprise us of the result they obtain.

"As you well know, I have for some time been afflicted with barium on the brain, and in accordance with homœopathic principles, 'similia similibus curantur,' I applied barium to all and everywhere, and below are the results. Before going any further, however, let me tell you that it is not my intention (for reasons best known to me) to enter into the merits of the question, and try to explain how and by what laws it acts ; but it acts, that is the main point ; I therefore leave it to you, gentlemen of the pointed hat, long robe, and magic rod, to decide and expound. But to the point. Sensitizing bath for plain or albumen paper—

Water	15 ounces
Nitrate barium	1½ ,,
Water	14 ,,
Nitrate silver	3 ,,
Alcohol	1 ounce.

When the solutions are complete, mix and make very slightly acid with nitric acid, float your paper from three to five minutes, and when thoroughly dry, expose to vapours of carbonate of ammonia ten minutes only. Paper so prepared will give prints of a slate blue colour, and will tone very readily. After thorough washing, and immediately before toning, immerse your prints in a weak solution of acetate of barium ; this precaution will, in all cases, prevent mealiness. Then tone in following :—

Chloride of gold	3 grains
Chloride of uranium	1½ ,,
Water	30 ounces

made neutral two or three days in advance with carbonate of barium, and stirred frequently during that time ; just before using above, drop in say 5 grains chloride of sodium. Acetate or phosphate of soda can, according to tones desired, be added to this bath. After two changes of water the prints are immersed in hypo. 1 ounce to 5 of water, in which throw 25 or 30 grains of carbonate of barium. With the above-mentioned silver bath, I have printed with Roettger's solar camera a half life-size picture in fifteen minutes, when it required with the same negative and nitrate of soda bath one hour.

---

* *Philadelphia Photographer.*

* *Philadelphia Photographer.*

"By same mail I send you the recommended broomstick, around which please find three prints. The one on plain paper is toned in the gold and baryta bath, and the two on albumen are toned with gold and uranium bath, without baryta or phosphate of soda. The three are sensitized in the silver and baryta bath, and have been printed in one-fourth of the time required for other baths. I do not send these prints as *chef-d'œuvres*, but simply to let you see how far I have progressed in my working of the solar camera. The landscapes are pictures of the interior of my yard, and the portrait is one of my little daughter.—Very truly yours,

Proselyte."

"*New Orleans, December*, 1865."

[We cannot speak too much in praise of the prints received from our obliging correspondent. They are all that could be desired in tone and clearness, and nothing better could be wished for. Both the plain paper and albumen prints are very good, as is also the little girl's portrait on albumen paper. — Ed. *Philadelphia Photographer*.]

Correspondence.

THE ACTION OF DEVELOPERS IN PRODUCING THE IMAGE.

Sir,—Allow me to call your attention to a matter which I think (broadly) explains the discrepancy in the results obtained by the different operators who have tried the new developer. In the first place, I must state it as my opinion that this discussion has been of too purely a practical nature to lead to any definite conclusion, and that if we would thoroughly understand this and many other matters connected with photography, we must study more closely the principles our practice involves than appears (generally speaking) to be at present the case. It is under this impression that I now offer a few theoretical remarks, that suggested themselves while studying the action of the organic developer.

Although the scientific world is still divided in opinion as to the change induced by the actinic ray on the prepared surface (a circumstance to be greatly regretted), still the result of that action, whether chemical or molecular, is the production of an attractive force for metallic silver. This force is recognised on the application of the developer.

When a prepared plate is exposed to light, this force is generated, but its attraction for metallic silver is too feeble to overcome the chemical affinity of nitric acid for that element; hence the reason why the picture does not develop, though free nitrate be present upon the exposed film; but if we apply an agent capable of reducing the nitrate, our picture appears; that is, the attractive force seizes on part of the freed silver, appropriating and holding it, as it were, on the surface of those parts affected by light. This action takes place more or less readily in proportion to the energy of the reducing agent employed and intensity of the attractive force. Iron develops a negative more rapidly than pyrogallic acid, and an over- sooner than an under-exposed one. Now, the conditions observed in taking a negative by the wet collodion process prescribes a limit either to the action or accumulation of this force. For instance, in taking a view, it is impossible to preserve the beautiful gradation of tint in the sky, at the same time exposing for the details of the landscape. One or other must be sacrificed. And why? Simply because that point is soon reached when a further action of light has no power of producing an additional accumulation of this force, and therefore the details appear as soon as the high lights, no picture, or a very bad one, being the result. Further, it appears evident that it is only that part of the nitrate decomposed by the united action of this force and the developer, the silver from which is (or ought to be) appropriated by the former for producing the picture.

If this view is correct, we can plainly see how the production of a deposit of metallic silver, so as to faithfully represent the action and intensity of the effect produced by the chemical ray, depends upon the proper balance of these two forces, namely, the attractive force and the reducing agent. Therefore, those operators who have attained this end by other means have no need to introduce a modifying agent (like organic matter) in the developer; in fact, it would only disturb equilibrium. But when, owing to some defect, either chemical or manipulative, the harmonious working of these two forces is disturbed, the addition of a substance that modifies the action of one or both of them may tend to or completely restore equilibrium.—Yours truly,

Herefordshire, Feb. 13, 1866. T. T. G.

TALENT—MYSTERY IN ART—LIGHTING.

Sir,—"Respice Finem's" anecdote of the Rev. Robert Hall only proves that this rev. gentlemen was not altogether polite in his joke, and that *he* did not speak of the word talent as he would of a piece of money, when he used it to indicate a natural gift or faculty. I commend his example to "Respice Finem."

"Respice Finem" might as well "protest" against the "awe-inspiring mysteries" of nature as against those of art, or against his own existence as either. I remember hearing of some one who protested against water freezing in winter, but I never heard that anything came of it. Art *has* her mysteries as well as science, despite "Respice Finem's" protests.

I no more argue for absurdities or incongruity and the publication of impotent efforts than "Respice Finem" does. "Pot-boilers" and "studies" are quite distinct things. The former are done without studies; the latter are executed purely as *studies*, and are therefore often more valuable than finished pictures less studiously executed. My opinion of pot-boilers pure and simple—that is to say, as things made *only* to sell—whether they be paintings or photographs, agrees with "Respice Finem's."

With regard to studying lighting from the life and from plaster, it is like studying agriculture as an introduction to botany. The two things are so essentially different that experience gained from the one will be *comparatively* useless when applied to the other.—I am, sir, yours, &c.,

An Artist.

["An Artist" overlooks the fact that "Respice Finem" protested against the simple teachings of elementary art being enveloped in "awe-inspiring mysteries," as bewildering to art-students. Without entering into the question as to whether art does or should contain mysteries, we may suggest that art is of human origin, nature of divine origin. In speaking of the mysteries of nature we refer to the works of the Creator; in referring to mysteries of art we refer to those of the creature. It is hardly necessary to dwell on the disproportion of the two subjects. It is a want of perception of the difference between the two things which makes "An Artist" liken an impotent protest against the natural law of freezing to a protest against a foolish practice of talking and writing fustian, which may easily be avoided. This discussion is passing out of the limits in which it can be instructive, and must cease here. The portions of our correspondent's letter in which he speaks of his own personality and of that of "Respice Finem" are unsuited to our columns. We may add, however, that we do not know "Respice Finem" under any other *nom de plume*. —Ed.]

Photographic Notes and Queries.

The Action of Light on Iodide of Silver.

Sir,—After considering carefully the beautiful experiments of M. Carey Lea on the nature of the latent image, I am still at a loss to imagine how the object sought for can be attained by either the physical or chemical theories. I apprehend the question to be, What is the cause of the precipitation of silver upon those parts of the film acted on by light? And if the solution of this query is the object, it is no nearer attainment by the establishment of either of these theories than before.

Guided by a knowledge of certain principles, or laws, acquired by long study of the phenomena of nature, I gave a solution of this problem which will, I think, stand the test of the most rigid scrutiny. And, still guided by these principles, in my last paper I gave the cause for the equal diffusion of natural light and the phenomenon of twilight.

I mention this, not from egotism, but to call the attention of the scientific world to a system of laws or theory of nature, the application of which will enable the experimentalist to determine the causes of every phenomenon (excepting all relating to life) which may fall under his observation.—I am, sir, respectfully yours,

Thomas Ayers.

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Talk in the Studio.

Clouds in Landscapes.—A correspondent says:—"I have recently read some articles in the News on 'Clouds in Landscapes,' and also Mr. Carey Lea's views on development (p. 508. vol. ix.), with which experience has taught me to differ. I resided for some years in India, and occasionally took a landscape. My exposure was only very seldom instantaneous; however, I always contrived to get both natural clouds and sufficient detail in the dark objects, trees, &c. I used a highly bromized collodion, containing bromide and iodide in equal parts, and a very strong developer, averaging between 10 and 25 per cent., but never less than 10 per cent." The specimens produced by our correspondent fully bear out his remarks.

Photography in India.—Judging from the Indian daily press, photography appears to be a prominent topic of public interest in the east. Taking up at random, from a club-room table, a copy of the *Indian Daily News* (Jan 6th), we find a leader devoted to the Annual Photographic Exhibition which has just closed, and especially regretting that it "cannot review the eighth exhibition of a society which has so deservedly distinguished itself as a valuable adjunct of Indian art without expressing some disappointment at the unfortunate contrast which, taken as a whole, it presents when compared with some of the exhibitions of former years." The first prize is described as having been given to a picture which equalled the finest in England or on the Continent of Europe; but all the others are awarded, it is stated, to worthless pictures. The leader concluded by saying:—"We dismiss this subject as lightly as possible, with the hope that the next exhibition will supply not quite so many of the La-Creevy style of portraits; but we cannot close our notice without reference . . . . to some English views photographed by Mr. McFarlane, which are so charmingly executed that they absolutely tantalize any one who examines them by the fidelity with which they recal 'home." From the advertisement department of the same journal we find professional portraiture apparently active in Calcutta, and that Diamond Cameos, "Doubles," &c., are prominently announced. In the Paris correspondent's letter on the same day we find half a column devoted to a notice of Bingham's portraits of the English Royal Family, in which the physical characteristics, dress, &c., of the various members, are discussed with a freedom somewhat unusual, if not audacious.

The Polytechnic Institution.—We commend to our readers who wish to spend a delightful and instructive evening, a visit to the Polytechnic Institution, where much may be learned from Professor Pepper's "Half-hours with Sir David Brewster." The optical illusions, consisting of the Delphic Oracle and Floating Cherubs, after Sir Joshua Reynolds, are the most beautiful and wonderful which the varied modifications of the Ghost principle, first introduced at the Polytechnic, have presented.

Silver in the Sea.—While experimenting on the qualities of silver present in sea water, Mr. Field, F.C.S., stated that he had examined some Muntz's metal sheathings which he had obtained from the captain of the brig *Nina*, which had been some time in the Pacific. In 1,700 grains of sea water he found .003 per cent of silver, or 19 dwt. 14 grains per tun, while, in examining the same quantity of metal which had been fastened to the ship's bottom, he found .023 per cent, or 7 oz. 13 dwt. 1 gr. per tun.

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To Correspondents.

Hopeful.—It is possible to produce a life-size copy of a carte de visite from the print; but it will necessarily be very coarse, as the texture, &c., of the paper is magnified at the same time. If the print be sharp and perfect, and the enlargement be well done, it is possible to get a moderately good basis for painting upon. We shall have pleasure in seeing the painted enlargement you mention.

Microscopic Portraits.—T. Gabriel, of Douglas, Isle of Man, wishes to inform "C. M." that he can give him some information on the subject.

A. H. Irvine.—There is no photographic exhibition open at present in London; nor is there any announcement of one at present.

A. De Latour.—We shall have pleasure in trying the powder sent the first day on which weather and opportunity permit.

J. Stace.—Much depends on the amount of enlargement, the lens, and other circumstances. Probably from ten to fifteen minutes. 2. There are no secrets, that we are aware of, in using the lime light for enlargement. Experience is, of course, necessary to success; and that can only be obtained by practice. Mr. Smyth's formula for solar camera work, given in our Year-Book for 1864, will be as suitable for artificial light as any we know. 3. We cannot tell you the cost.

Perplexity.—We have occasionally met with such markings, but cannot, with certainty, state the cause. It proceeds, we are tolerably certain, from some imperfection in the collodion, as we have found it occur persistently with one sample of collodion, and be absent in others used under all the same conditions. If we had not noticed this fact, we should have traced it to some floating scum on the surface of the bath, which lodged on that portion of the film, and made it insensitive. The shape and character of the mark would justify such a view; and it is possible that the character of the collodion might have something to do with such scum adhering readily to the film.

G. Gethins.—No. 5 would probably suit you as well as any of those you name. You should, if possible, obtain an opportunity of trying before buying. Your letter arrived too late for answer in last week's News.

Richard G. Scriven.—The work has no English publisher, but can doubtless be easily obtained through a foreign bookseller. Your own bookseller could doubtless obtain it for you by ordering it through some such house as Trübner's, Paternoster Row.

Tidy.—In the position you describe, you seem to have little choice; but in any case you will have least trouble if the sitter be placed with his back to the south. Can you not build the studio so as to present the two ends to east and west, and thus leave the side lights north and south. This would be better; the two ends would be then permanently opaque, and the south side might be so or not, as you liked. A ridge roof would be best in such case; but in the other a lean-to will do as well. The group is pretty good.

Old Pupil.—The polysulphide of potassium, known as liver of sulphur, is the best material for precipitating silver as a sulphide, not sulphate of potash nor sulphate of copper.

An Old Sub.—We shall be glad to receive your address, in order to communicate with you.

P. C. J.—After carefully examining your specimens, we can only counsel you to persevere in the same efforts for excellence you have been already making. Your photography is excellent. The chief thing required is the cultivation of artistic qualities. These are not entirely wanting now; but further culture will improve your results.

R. Lono.—Thanks. We shall bear the matter in mind.

B. L. R.—The addition of a chloride to collodion has been tried. We tried it some years ago in collodion for glass positives; the chiefly marked effect was an increase of brilliancy and freedom from any trace of fog. Mr. Keene some time ago recorded some experiments in our pages, in the course of which he found that the presence of a chloride in collodion made it less sensitive. 2. Fluoride of silver, being soluble in water, would be dissolved out of the film when formed, and the fluorides could not consequently be used with advantage in the collodion.

M. M. L.—The print is over-toned; the blue slaty tone is very unsatisfactory The best mode of dealing with freckled complexions and red hair, is to give a very full exposure, and use a freely bromized collodion. In almost all cases over-exposure is a better fault than under-exposure.

T. A.—The subject is scarcely suitable for discussion in our pages. Our aim is to deal practically with what is known, than to discuss general theories only remotely connected with our art.

CONTRIBUTIONS RECEIVED.	£	s.	d.
For Mrs. Goddard, from P. W.	2	0	0
For Mr. Hardwich's Church, from P. W.	3	0	0

◆

Photographs Registered.

Mr. J. Pender, Waterford, Ireland,
    Portrait of Rev. T. English.
    Photograph of Messrs. R. and W. De la Pour.
    Two Photographs of Rev. E. Walsh.
Mr. J. F. Ward, Stratford-on-Avon,
    Photograph of Skeletons, &c., found near Stratford.
Mr. S. Hogoard, Middlesboro',
    Portrait of Marshall Fowler, Esq.
    Portrait of W. Gray, Esq.
Mr. Jas. Andrews, Swansea,
    Portrait of Francesco Giardineri.
Mr. S, Walters, Bootle,
    Photograph of Sketch of the Foundering of the "London."
Messrs. Minshull and Hughes, Chester,
    Photograph of Dean of Chester.

THE PHOTOGRAPHIC NEWS.

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ON BACKGROUNDS IN PORTRAITS.

It is not necessary to repeat the trite story, told by Sir Joshua Reynolds in his Notes on Du Fresnoy, to the effect that Rubens said to a young student, that he who could paint his backgrounds stood in no need of instruction; nor is it necessary to add that Sir Joshua himself believed in the importance of the background, which his anecdote illustrated, as we learn from Fuseli that, whatever portion of his picture he entrusted to assistants, he always painted the backgrounds himself. The importance of the background is generally acknowledged; and the very existence and prevalence of the elaborate incongruities, which so often do duty as pictorial backgrounds in photographs, are in themselves sufficient evidence that photographers are not indifferent to the subject, even if their efforts for effect are not guided by knowledge. In briefly examining the subject we shall, for the sake of order, consider three questions relating to it.

First. What is the object of a background?

Second. Should a pictorial background be true or false?

Third. What is truth in a background?

First. What is the object of a background? The presence of a background of some kind to the portrait cannot be avoided; the white paper on which the picture is produced would itself constitute a most obtrusive background. The old Daguerreotype text-books used to contain instructions for an "invisible background;" and if such a thing could really be obtained, it would, for many portraits, be the most desirable which could be produced; that so described, however, simply consisted of an even tint of unobtrusive dark grey, produced by the use of a revolving screen covered with a blanket or cloth with a shaggy nap, the constant motion of the screen producing a spotless, textureless surface, so little conspicuous that it was styled invisible.

The majority of the best portraits by the best masters have no background which strikes the eye, the figure merely being relieved by light and shade, or a variety of broken tints. One of the finest portraits in the world—the Gevartius of Vandyke—has such a background; Guido's portrait of Beatrice Cenci has the same kind of background; and so have hundreds more of the finest portraits of the best masters. A background of one uniform tint, unbroken by light and shade, or effect of atmosphere, is—especially if the colour be bright—an unsatisfactory effect, making the figure appear inlaid, and cutting hard against the background. Such an effect is often present, and is decidedly unpleasant in the otherwise noble portraits by Holbein. For a certain class of photographic portraits, however, the plain background, especially if it be skilfully contrived by light and shade to relieve the figure, will always be most satisfactory. In such cases the sole object of the background is to be as unobtrusive as possible in itself, and to contribute as far as possible to give relief and force to the portrait.

But there are many cases in which a plain background, unrelieved by design or accessory, will give a meagre and unsatisfactory effect to the picture—in most full-length pictures, for instance, and especially in full-length card portraits. It is to avoid the bald and naked effect which a single standing figure presents when placed in front of a plain background, without accessory of any kind, that pictorial backgrounds, with all their enormities, have been introduced. Properly managed, however, there can be no doubt that they frequently aid in securing harmony in the composition and pleasing pictorial effect to a portrait which otherwise would have been most meagre and mean.

The photographer is much more restricted, both in resource and in aim, than the painter in the management of his background. Fuseli says:—"By the choice and scenery of the background we are frequently enabled to judge how far a painter entered into his subject, whether he understood its nature, to what class it belonged, what impression it was capable of making, what passion it was calculated to arouse; the sedate, the solemn, the severe, the awful, the terrible, the sublime, the placid, the solitary, the pleasing, the gay, are stamped by it. Sometimes it ought to be negative, entirely subordinate, receding or shrinking into itself; sometimes more positive: it acts, invigorates, assists the subject, and claims attention. * * * A subject in itself bordering on the usual or common may become sublime or pathetic by the background alone, and a sublime or pathetic one may become trivial and uninteresting by it." The range of effect here indicated far transcends anything possible to the photographer. Nevertheless, he may at times give character to his pictures by the selection of characteristic backgrounds and accessories. This has been to some extent successfully done by M. Silvy and some others, and may, in judicious hands, be still further carried out. But it is clear that the use of characteristic accessories can only become the exception, and not the rule, as by far the greater majority of portraits do not admit of any such aid from characterization. It is manifest, moreover, that the photographer cannot, like the painter, prepare a background of different and characteristic design. If, then, he is under the necessity of using the same or similar backgrounds for all ranks and conditions of men—the peer and the peasant alike—they must of necessity be sufficiently devoid of special character to suit any without incongruity.

Whilst, then, the background may at times become an essential part of the picture, and assist in telling the story or suggesting the character, it is tolerably clear that in the majority of cases the background in a photograph must play a subordinate part, performing its office best when it is so unobtrusive that it is not noticed at all; and if it be sufficiently full of design to attract attention, its design should aid the composition by balancing lines and tones, but always retiring so as to give prominence to the portrait, which is the principal object in the picture.

In speaking of the background, it should be borne in mind that it properly includes all objects, whether painted or real, which are accessory to the subject of the picture; and the skilful arrangement of a few objects with the use of a plain screen of neutral grey may often be quite as effective in supporting the figure as the most elaborately painted design, without involving the inconsistencies which attend the latter in injudicious hands.

Second. Should a pictorial background be true or false? It ought not to be necessary to ask such a question in relation to anything connected with an art like photography. Even if error creep into practice,. it would scarcely have been anticipated that any one would justify it on principle. But strange are the vagaries of the human mind, especially when it has a latent purpose to serve; and falsehood, or otherwise "conventionalism," in backgrounds has found advocates. Our discussion of the question is, however, based on abstract grounds, and we shall avoid connecting it with personal considerations.

The argument for dispensing with truth in backgrounds arose out of an admirable paper by Mr. Werge, in which he condemned the errors common in painted backgrounds, especially noting the prevalence of false perspective. He pointed out that as, in nature, the horizon was always on a level with the eye of the spectator, it should, in order to approximate to natural truth, be opposite the lens on the painted screen; and that the low horizon common in card backgrounds, besides being untrue, gave an effect of unnatural height to the figure. The statement of the case, as based on the well-known laws of perspective, with illustrative diagrams, will be found on page 30 of the present volume.

Some extraordinary objections to this statement of perspective laws and the diagrams by which it was illustrated were made by one member, who intimated that in the second diagram the horizon could only occupy such a position in a bird's-eye view; and that a man's portrait, with a background so painted, should give a bird's-eye view of his figure. showing the top of his head, which would be buried in his shoulders. We shall not insult our readers by pointing out that with the point of observation at right angles with the landscape, as shown in Mr. Werge's diagram, it would be impossible to obtain a bird's-eye view; and that with the camera opposite a man's face or chest it would be impossible to give a view of the top of his head, or represent his head buried in his shoulders. Such errors as these are not likely to do much mischief, as they are not likely to deceive the most thoughtless and unlearned.

But another objection followed, which, because more specious, and having some warrant in precedent, is more dangerous. It was alleged, that as the background was a purely conventional as well as subordinate part of the picture, and as it was confessedly a painted screen, and not natural scenery, it was, therefore, legitimate to ignore natural truth, and adopt a conventional treatment, especially if any pictorial advantage could be gained by so doing. We shall not pause to consider in detail the meaning of conventionalism in art, although the subject would be an interesting one. Suffice it to say here that the term implies something not accurate in itself, but sanctioned by custom. The conventional background is tolerably familiar, and in its most favourable phases is one which contributes to the effect of the figure without reference to its own possibility or truth. These backgrounds have undoubtedly the sanction of custom and of great names, and their use is—not defended by able men, because they do not appear to have been called in question—but recommended as conferring certain advantages.

The low horizon is one of the prominent features of this conventional background, and it is adopted confessedly to give importance and dignity to the figure, these apparently being considered of greater importance than truth. Rubens frequently adopted this custom, and in the treatment of an imaginative subject like his "Castor and Pollux," in which the horizon line is scarcely higher than the knees of the horses, it may be possibly admissible, as giving a Titanesque and heroic proportion to the figures. But when, in the portrait of his own "Second Wife," the horizon is in a similiar position, it gives to her figure proportions which are not dignified, but monstrous. This practice obtained, nevertheless, amongst many great masters of the post-Raphaelite period, when painting was gradually tending more and more towards conventionalism, and will be found almost universal in the pictorial backgrounds of Reynolds, Gainsborough, Lawrence, and others; and the practice is justified by some on the ground that as such large pictures are to be hung above the eye, the effect will be truer.

But there is another point of justification for the painter, which is not applicable to the photographer. The painter could produce such an effect, and still preserve truth of effect: it was simply necessary for him to take a low point of observation, and the horizon line, if necessary, became low, whilst his foreground figures might tower above it. In one of the noblest pictures in existence, in which the low horizon exists and is regarded as one of the effective points in the picture—we refer to Titian's "Martyrdom of St. Peter"—the method to which we refer is adopted. The point of observation appears to be about level with the prostrate figure of St. Peter; the spectator looks under the upraised arm of the murderer, and a grand effect is obtained without any sacrifice of perspective truth. To be equally consistent in using a low horizon in his pictorial backgrounds, the photographer must lower his camera, and, to suit some backgrounds we have seen, bring it on a level with the knees of his sitter. Even amongst painters there are some who have protested against this conventional treatment of backgrounds. The late Royal Academician, Leslie, says: "It would often be found easier to the painter, as well as far more agreeable, to copy realities, than to weary himself with ineffectual attempts. to make the eternal pillar and curtain, or the conventional sky and tree, look as well as they do in the backgrounds of Reynolds and Gainsborough."

In the practice of Raphael and the best of the earlier masters, this conventional licence was never adopted. What it has led to in later times, in the sacrifice of truth to pictorial effect, may be best illustrated by mentioning the fact, that in a work, otherwise very excellent, by an able artist, and son of a Royal Academician, we find the advice given "to introduce shadows of all kinds and degrees that may suit the purpose, whether *possible* to be found under such circumstances in nature or *not*;" and in justification of this advice he insists that "in the present state of opinions on art, and practice of professors,* that the picture must be made honestly if you can, but make a picture. And so long as those pictures, by Sir Joshua Reynolds and others, continue to receive admiration, in which the figures are supposed to be lighted in front by moons introduced into the background, amateurs are fairly entitled to avail themselves of the licence." And this kind of licence is the conventionalism recommended for the adoption of photographers!

All that can be said, however, on behalf of the practice, conventionalism in the hands of the painter ceases to have weight when urged on behalf of its use by the photographer. He, if he value his art at all, must be true. We believe that landscape backgrounds can be painted so as to be both effective and approximate closely to the truth of nature; but of that, more under the next head. If it were imperative, however, that untruth characterized pictorial backgrounds, we should say, "Away with them altogether!" The shortcomings of photography on the score of beauty, which are at times painfully manifest, are generally pardoned on the score of its truth. "The first, last, greatest beauty of photography is its truth." There is no room in photography for artifice and trickery.*

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* This was written before the advent of photography, or the pre-Raphaelite renaissance.—Ed.]

We have already exceeded the limits intended for this article, and must defer consideration of our third question until our next.

MODERN PORTRAIT PAINTING AND PHOTOGRAPHY.

An article in the *Contemporary Review*, on "Modern Portrait Painting," by Lowes Dickinson, contains many remarks on the general subject of portraiture, and on photography in relation to it, which, if not altogether just on the latter point, will interest our readers. Portraiture is, according to this writer, the highest phase of pictorial art, far transcending in interest and importance the best works of an imaginative character. He says:—"The production of a grand portrait is one of the highest efforts of the human mind. Among all the painters who have ever lived, only the greatest have succeeded in fixing upon canvas the impress of the soul, as well as the features of the individual man or woman; and these are just the works that are priceless, that possess an undying interest for the learned and unlearned of each succeeding generation, far beyond that created by all the Martyrdoms and Assumptions that have ever been painted."

Probably many readers will take exception to this estimate of the art position of portraiture; but in his recognition of the interest felt in this branch of the art in this country, there will be general acquiescence. He remarks:—"Portrait painting has always been, and, as long as the national character remains the same, will continue to be, a necessity in England. When we had no native artists, we invited the most accomplished painters on the Continent to take up their abode with us; and our country houses contain a rich collection of portraits of Englishmen by those Dutch and Flemish masters who were domiciled amongst us, as well as of the rarer portraits of princes and burghers by Titian, Velasquez, Rembrandt, and Vanderhuylst, which it has been the object of so many great proprietors to possess.

"In the display of miniatures at South Kensington, comprising specimens of the art as it has existed amongst us for more than three centuries, and reflecting, as it does, the kindly affections, or the innocent vanity, of generations passed away, we have another proof, if evidence were wanting, of the absolute craving that exists in this country for portraiture of some kind,—good if it can be had, bad rather than none at all. We cannot live without it. The grandest portraits in existence were undoubtedly painted on the Continent, by the great Italian and Spanish artists: kings and princes, knights and ladies sat for them; but England is not the less the true home of portrait painting. We love to look at the portraits of our distinguished and historical Englishmen, even more than to read about them; more than this, we must have the likenesses of our fathers and mothers and sisters, and we are not sparing of encouragement and money to the painter whose canvas shall at once speak to our affections. Portrait painters who would have starved on the Continent have attained position and fortune in England."

After some comments on the degeneracy of modern portraiture and its causes, the writer enters into an estimate of the influence of photography on painting generally, and especially on portraiture. Apart from the feeling of contempt which manifestly pervades the remarks, his estimate generally is just. He says:—"It is impossible to overlook the influence which, for good or evil, is now being exercised, and probably will be exercised, through all future time, by the marvellous discovery of photography, and its application to the ends of painting. It is at least a question whether what is called pre-Raphaelitism in England is not due to this discovery, acting upon a few minds unconsciously impressed by the clear manifestations of important truths hitherto smothered under broad conventionalisms. The geology of landscape, for instance, was but little appreciated by painters, before they were taught by photography that the stratification of a rock cannot be expressed by a few vague and ignorant touches. No painter ever taught us so much about the Alps as the photographs of Bissor or the small stereoscopic slides with which we are so familiar. Let us readily grant that photography is not a fine art itself; neither can it possibly take the place of any intellectual work; that it can exercise no power of selection, modify no expression, raise no emotion, evoke no sympathy; but although it can never raise us to the contemplation of any spiritual truth, it reproduces accurately the aspect of the material universe. Its effect upon the art of our generation has been great, not perhaps altogether good. So far, it has certainly given an undue impulse to the merely imitative faculty, while the noblest of human faculties, the imagination, has been in abeyance; but we cannot but think that its influence will tend in the long run to strengthen the latter, by endowing it with a more accurate and enlarged experience. We may at least be grateful that it has displaced a great deal of bad art. A photograph of the Colliseum or of Notre Dame is better worth having than the incorrect lithographs that used to stand for them; and the sun gives us a better idea of Vesuvius than the execrable *gauche* drawings that were formerly exposed in the Neapolitan print shops. And although we may regret the temporary eclipse—for such we trust it is—of miniature painting, we have little reason to deplore the annihilation of that cheap art of portraiture to which Mrs. Lirriper was sacrificed, and to the professors of which, as she says, 'you paid your three guineas, and took your chance as to whether you came out yourself or somebody else.'

"But while the influence of photography may be clearly traced in the more careful study of form and detail which distinguishes our living subject painters from their immediate predecessors, our portrait painters have refused to profit by a discovery which might be to them an invaluable handmaid, while it never could become a successful rival.

"Want of strong individuality is the characteristic of nearly all modern portraiture; not only in the countenance, but in the action and build of the figure. The old masters were all alive to the importance of making a portrait an absolute fact in the first place; and although Titian and Vandyke, each in his different way, by surpassing knowledge of treatment, ennobled the aspect of their sitters, they never sacrificed an iota of character. With modern portrait painters it is a common practice to sacrifice their strong faculties of observation to the prevailing taste of the day, or to the requirements of family affection and prejudice. Against this weakness photography bears witness in a hundred ways. Harsh, black, unpleasant, and ugly as you please, and utterly contemptible as a work of art, a photograph sets before us a true representation of the cranium, the exact set of the features, and the general build of the body, with a marvellous accuracy that it is out of the power of any human hand to rival. No child will mistake it, the dullest clod will recognize it; yet it is but a dead image, lacking the spark of human intellect which gives life to the meanest work of the hand, and we have more sympathy with the work of a sign painter than with it. But by the intelligent portrait painter, surely the representation which conveys the exact conformation of the skull, the air and custom, as it were, of the man in his bodily presence, rendered so faithfully by this wonderful agent, should be received thankfully and modestly; he should use it as Vandyke or Reynolds would gladly have used it—as a valuable aid, not as a base trammel."

In the remarks on the lack of human interest and intellect in the photograph we have the old story—we had nearly said the old cant—to the effect that the photograph lacks a soul, &c., which the painting is said to possess. We once more deny this position. A bad painting and a bad photograph may both be mechanical and unsatisfactory enough; but we affirm that a photograph which, taken under happy conditions, as an absolute reflex of the face when it was lighted up with thought and feeling, and not when it was dull, weary, or expressionless, possesses more truly a soul, and has more of human interest, than nine-tenths of the portraits which every year smirk on the walls of the Royal Academy. Such are many of the portraits recently produced by Mr. Rejlander, in Edinburgh, under circumstances in which the majority of the usual appliances were wanting. They were not taken in the photographer's studio, where the arrangement of lighting and facilities for manipulating are under the operator's control; but in private drawing-rooms, in the open air, &c., admirably justifying the remark in Mr. Robinson's excellent paper on Glass Houses, to the effect that Mr. Rejlander would take artistic and fine pictures under circumstances that would puzzle most people. But he had two advantages: he took the portraits of persons with whom he was mingling in social intercourse, and so studying their real expressions; and he had a thorough practical knowledge of art principles, which he could readily apply under new circumstances. As to the use which skilful painters might make of photography, there can be little difference of opinion, and we cordially agree with the writer. His estimate of photographic colourists, or "modifiers," is manifestly low, and, it is to be regretted, is, in some well-known instances, justified. He says:—"At present it is, for the most part, neglected by those who might well profit by its help, and debased by the modifications of sixth-rate miniature painters, so that many of our portrait painters are half afraid to make use of it, and altogether afraid to acknowledge its value."

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* We quote these sentences from an inaugural address, by Mr. Jabez Hughes, at the formation of the Glasgow Photographic Society, from which we shall take occasion to give our readers some extracts.

Mr. Dickinson believes photography will eventually raise the art of portraiture, and that it is now exercising an influence on it of which the artist is scarcely conscious. "That it must eventually be the means of raising the art of portraiture to a more subtle and higher rendering of truth, we firmly believe. As yet our contemporary portraiture shows very little evidence of this; but we may mention the admirable portrait-busts of Mr. Woolner in illustration of the effects produced by this wonderful discovery upon an active and sensitive mind. Mr. Woolner is probably wholly unconscious how many of the really valuable results of photography he has appropriated and embodied in his work. No portrait painter has yet seen or felt the true use of it, or we should have less reason to complain, year after year, of the portraits that are said to disfigure the walls of the Royal Academy. The infusion of that hard, stern reality which we so greatly deprecate in a photograph is more than all else needed in modern portraiture, and though a second-rate painter may fear to become the slave of the process, and is ever ready to dread that his work may be superseded by its mechanical results, the truly accomplished artist, who has mastered the greater difficulties of his art, will recognize in photography the most valuable of those mechanical aids which from time time have been placed at his disposal by the discoveries of science."

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CONTRIBUTIONS TO OUR KNOWLEDGE OF THE CHEMICAL ACTION OF SUNLIGHT UPON SENSITIVE PHOTOGRAPHIC PAPERS.

BY CHARLES R. WRIGHT, B.SC.

An abstract of a paper bearing this title was read at the meeting of the Chemical Society on the 1st inst. The conclusions established by the author's experiments were briefly as follows:—

1st. All papers prepared with solutions of alkaline chlorides (and subsequently treated with nitrate of silver in excess), darken to the same extents in the same *relative* times, no matter with what alkaline metal the chlorine be combined, and no matter what be the percentage of chlorine in the salting solution.

2nd. The same holds true for papers prepared with bromide solutions; and hence probably for all the others.

3rd. Photo-chemical induction does not exist to any appreciable extent with chloride, bromide, and bromo-iodide papers; and hence probably with none of the others.

4th. The relative times for which pieces of any one of the above papers must be exposed to light of a constant intensity in order to gain a definite series of tints vary with each paper.

5th. The relative intensities of light to which pieces of any one of the above papers must be exposed for a constant time in order to gain a definite series of tints vary with each paper.

6th. The relative times for which pieces of any one of the above papers must be exposed to light of a constant intensity in order to gain a definite series of tints are in the same ratio to one another as are the relative intensities of light to which the same piece must be exposed for a constant time in order to gain the same series of tints.

7th. The relative times for which pieces of any one of the above papers must be exposed to a constant source of light in order to gain a given series of tints, or the relative intensities of light to which they must be exposed for a constant time to gain the same series of tints, are given by the table.*

8th. By the aid of this table the relative sensitiveness of any of the above papers with respect to any particular tint can be calculated, when their relative sensitiveness with respect to some one given tint are known.

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ON THE NATURE OF THE CHEMICAL ACTIONS INVOLVED IN THE PRODUCTION AND DEVELOPMENT OF THE PHOTOGRAPHIC PICTURE.

BY NELSON K. CHERRILL.†

The next experiment is that performed by Mr. Carey Lea, and repeated, in slightly different form, by Mr. Long, and again by Mr. Ewing.

I would point out that these experiments are, when viewed in the light of the theory of polarization, all identical, and may be traced to a very simple cause.

Mr. Carey Lea poured over a developed picture a solution of per-nitrate of mercury, which dissolved away all the precipitated silver. At this point the action was stopped, and after proper precautions the image was found to redevelop with great ease. Mr. Long objected that this experiment dissolved away some of the iodide of silver at the same time; but this only confirms me in the opinion that the action is due to polarization (in fact, it was this suggestion which first put this idea in my head). It will be easily seen, with regard to Mr. Long's remark, that if Mr. Lea did dissolve away the iodide, say down to *c* in the diagram, this would in no way prevent the image from reforming on the molecule *d*. It will be also easily seen that to dissolve off a part of the polarized film is not the same thing as to destroy the polarity of a single molecule.‡

The experiments described by Mr. Ewing are more difficult to account for, but still I do not see that they negative the theory of polarization. I have since repeated them in a slightly modified way, of which I will now speak. An old plate, fixed, but not varnished, was treated with nitric acid, and of course, on the developer being applied, I got an image, as in Mr. Ewing's experiment. I now took an unfixed plate, and after treating it with nitric acid, I fixed it with hypo, and found that no difference was made in the after effect of the developer.

I now tried the same experiment, and instead of pouring on the developer, I treated the plate with iodine as before, and then fixed it again with hypo, and this time I succeeded in the destruction of the latent image, so that when the developer was poured on I did not get any picture.* Now I think that all these results may be accounted for, more or less, by the theorem which I have given before, referring to the last diagram, and supposing that the image is formed by piling up silver on the molecule *a*. The action of nitric acid would of course be only to dissolve off the silver and leave the atoms of iodide in a state of polarity as they were before. But if, before the application of the nitric acid, we "fix" the plate with hypo, we shall of course dissolve off all the unaltered iodide, and probably some of that in a state of polarity. I say that some of the polarized iodide would be probably dissolved off, because I do not see the least reason to suppose that the last molecule (*a*) could be dissolved off, nor is there any proof that any of the atoms of the iodide, in a state of polarity, would be dissolved by the hypo. But this, it will be said, is not at all supported by practice; I must therefore enter into a little explanation. It is quite evident that if hyposulphite of soda would remove *all* the iodide of silver from the film, and if, also, the nitric acid could remove *all* the silver, then we could not redevelop any image on the plate treated with both of these substances; it would be contrary to all analogy and all principle to suppose that the simple film of pyroxyline has any more attraction for silver in one place than in another. From this consideration we may fairly infer that in the experiments of Mr. Lea and Mr. Ewing some iodide of silver is left in the polarized state after the application both of the nitric acid and hypo; in this case of course there would be nothing more than would be accounted for by the polarization theorem in these experiments.

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* This table is illustrated in the original paper by a diagram exhibiting a series of curves for the several compounds of silver.

† Continued from p. 101.

‡ To break a piece off from a magnet is not the same as to superinduce magnetism in the extreme molecules.

That such is the case seems to me to be borne out by two considerations, viz., that as I above mentioned, if, after the application of both acid and fixer, the polarity of the remaining atoms is destroyed by iodine, and the fixer again applied, we shall so destroy the polarity of the film as to be unable to obtain any further image on it. The other point is, that the colour of the "thin pale image" is just the same, even after fixing, as that of the iodide of silver.

In the next place then, of the formation of the image on the outermost molecule of the film.

We know enough of the results of the action of molecular force to be able to predict with certainty that matter of one kind has a certain definite attraction for molecules or atoms of a like nature. Thus, a crystal of any salt will "grow" by being simply placed in a solution of the same substance of sufficient concentration. So also we might predict that in the event of the action of light being to polarize the molecules of iodide of silver, &c., and to present the silver pole towards the light, such poles of silver would easily attract atoms of silver, or of any substance capable of combining with silver, when the atoms of such a body were placed in a favourable condition, and that such atoms would be attracted with a force the same both in kind and degree as that which determines, not only the formation, but the growth of crystals. From this consideration the development of the Daguerreotype would seem to be the most simple case of photographic development. It would be stated as follows:—Mercury cannot combine to form an amalgam with iodide of silver, but it can so combine with pure silver. If, then, the action of light in the camera is only to polarize the iodide, and so to present the silver pole towards the source of light, the action of development would be traced merely to the fact that the atoms of mercury forming the vapour would simply combine with the atoms of silver, and so would form, as would be most natural to them, an amalgam of silver and mercury which would form the picture.

The experiment performed with nitrate of mercury used as a developer, by Mr. Carey Lea, might be traced to exactly the same cause; indeed, there would be scarcely any difference in a theoretical point of view. And more than this—grant that the theorem of polarization is true, and we have an abundant reason for the failure by both Mr. Lea and Mr. Ewing in the attempt to use gold, palladium, pernitrate of mercury, China ink, &c., none of which could make any precipitate having any affinity with silver; in fact, we may, without going at all out of the way, look upon the latent image as the first commencement of a crystal which can never be augmented or increased by any substance not of a similar nature. Mercury is the only exception to this rule, and its action is peculiar, not to say unprecedented

I shall have more to say on this particular head when I come to speak of the action of the developer in a future paper.

The next head upon which I must now touch is the total reduction of some atoms of silver by the action of light. It is a well-known fact that under some very favourable circumstances a faint image may be seen on the wet plate before development. Such an image is often seen in the dry, especially in the tannin process. Will the theorem of the polar state of the film account for these appearances? I think it will.

To return for a moment to the analogous cases of electro chemical decomposition. We find that in all these cases, a law holds good, viz., that though a compound body may be placed in a state of polarity by an electrical current, one of its elements cannot be eliminated or evolved without a corresponding absorption or elimination of the other.

Now let us see what M. Vogel says about the sensibility of iodide of silver. He says that in order to produce exalted sensitiveness, the iodide of silver must be in contact with some other body capable of absorbing iodine. In this case, seeing the effect of the absorption of one element in the case of electro chemical decomposition, is it too much to suppose that if the action were continued under very favourable circumstances, some of the silver would be reduced, and that in sufficient quantities to be plainly visible?

In regard to this point there is a question whether any state of polarity can exist without partial reduction; but I believe that it can, and for this very simple reason (referring to the last diagram): if the series of molecules, *a*, *b*, *c*, *d*, &c., in a state of polarity, as is there represented, is considered merely as a change of position in the constituent elements, there can of course be no reduction. But it seems also very clear that if the silver molecule at one end of the series is in a position to be acted upon by silver or mercury, so also the iodine at the other pole must be in a position to be absorbed by any other substance with which it can combine.

It also might be thought a question whether any photographic image could be built up on the silver pole unless the same were first in a state of isolation; that is, unless it were reduced. But I consider that this point is abundantly settled by the experiments of Mr. Lea and others, who have shown that if all the reduced silver is dissolved off there is still a power left in the film of attracting a new supply from a fresh developer; and from these experiments it might be considered as proved that it is not necessary that there should be any reduction of silver in the latent image in order to cause the formation of an image by the developer.

Indeed, I do not see how it would be possible to reduce silver in the film by exposure to the light without making it visible (as in printing).

I have before suggested that the silver poles would be turned towards the light—that is, towards the direction from which the light came—besides the difficulty which would be presented by the phenomenon of the development of a Daguerreotype plate if this were not the case. Some light might be thrown on the subject by the consideration of a very simple experiment which I performed the other day. I took a prepared plate, and having exposed it as usual, I reversed it in the slide and exposed it again, so that the second picture should be taken through the glass, and consequently on the back of the film. On pouring on the developer both pictures were produced, and the thick film of iodide between them rendered both plainly visible, the one being on the top, and the other on the bottom of the film.

Now though this experiment can hardly be said to prove that the silver poles are turned towards the source of light, yet it gives some argument in favour of the supposition; it at any rate shows that the silver forming the picture is on the surface turned towards the lights, and that it is only on the surface of the film.

But it might be urged, that if the silver poles are turned towards the source of light, and so pressed up (as it were) against the surface of the glass, the developing action could not be carried on in accordance with the suggestion given before. In answer to this I may remark that, firstly, the depth to which the polarization of the atoms is carried is, or may be, very small indeed. It will be remembered that by atoms real chemical atoms or molecules are spoken of, and that there is no particular reason why the number of them in the thickness of the film should be limited;

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* I also tried these experiments with nitrate of mercury, as described by Mr. Lea, with the same results (the last experiment will not always succeed with old plates till after a second development).

and there is also no reason to suppose that a greater number of atoms are polarized in a vertical direction than there are different tints or gradations in the negative; and secondly, that, according to M. Vogel, we must have the presence of a sensitizing agent in order to produce a picture. If, then, the nitrate of silver solution (which is the sensitizing agent) can penetrate the film, there is no reason why the developing solution should not penetrate it too; and judging by the case with which water can get between the film and the glass, I do not see why silver should not get into the same position, especially when under the influence of chemical action. From this it might be seen that the question of obtaining a negative on the wrong side of the film presents no greater difficulty to the theorem of polarization than would the development of a similar image on the upper side.

But to return to the point—which was, that the silver forming the picture would be only on the surface of the film, whence there would come the curious indentations spoken of by Mr. Long. I will give an experiment which would go a long way to show that these are the result of action of polarization. A long bar of iron (about six feet long, and three-quarters of an inch in diameter) is hung in a horizontal position by a single wire, placed, of course, just in the centre; a small coil of insulated copper wire is then passed up over the iron bar to near the centre, and a current of electricity from a battery of some considerable power is sent round the coil, the contact being made and broken with great rapidity by means of a file. Under these circumstances the rapid changes of position effected by the molecules of the iron under the influence of magnetic induction will cause the bar to vibrate until it gives a loud musical note. Professor Tyndale has since shown, by actual measurement, the amount of expansion and contraction which takes place under the above circumstances.

Now, if a bar of iron will expand and contract by magnetic induction, I do not see any reason why iodide of silver should not expand or contract under the influence of polarization; it would rather seem as if it ought so to do. In fairness it must be said that there is hardly any change in chemical composition, or even of mechanical or physical state, with which we are acquainted, which does not involve some change also in bulk.

The fact that some sensitizing agents will, under proper circumstances, act as developers is one not easily accounted for by any theory but that of the polarization of the salts in the film.

I have before pointed out that if the silver at one end of the pole is in a position to be acted upon by mercury or to attract more silver, then, as a natural consequence, the iodine will be in a similar position at the other end of the series. It would seem from this that if, after action of light ceases, we applied a solution having an affinity for iodine, its effect would be to absorb more or less iodine from the iodine pole of the series, and by so doing, as the natural consequence, deposit silver at the silver end of the series.

I shall leave the full consideration of the points of interest involved in this suggestion till the next paper. At present I may only remark, that while the action of sulphate of iron developer is to pile up the silver, and so form an image, the first action of pyrogallic acid will probably be found to arise from its strong affinity for iodine, by which it might effect development as before suggested.

I would close the present paper by remarking, that if we allow the theorem of polarization which I have endeavoured to set forth, it would be but fair to grant that the analogy would be complete in all points between the chemical and the electric and magnetic forms of polarization; in which case the "blurring," "halation," &c., for which it is so difficult to account, would be found to originate in an induced state of polarity.

I have not made any experiments on this subject as yet; but the position is upheld by the consideration that "blurring" only will occur when there is a substance in the film having a strong affinity for iodine; that it only will occur in parts where the contrasts of light and shade in the picture are violent; and that, if traced to lateral induction, it would be found to complete the analogy between the chemical polarity of the salts in the film and the magnetic polarity of the mariner's compass.

THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Remarks on Actinism and its Influence on the Iodide and Bromide of Silver, &c.

Although practical effects that pertain to an experimental science are usually in advance of knowledge which elucidates causes, it by no means follows that experimentalists have perforce to work hap-hazard, leaving to chance the ultimate results of their labours, because in most instances data from other sources is offered as a guide, notwithstanding the branched path pursued being newly opened or comparatively untrodden. I willingly admit that an experiment which is based on analogical reasoning does not always produce anticipated results, but it cannot be considered that absolute loss ensues, as a failure in the one case is balanced by increased information in the guiding direction, or exposes the fact of operations having been conducted on wrong premises, a fault which seldom occurs when the subject has undergone the necessary preliminaries of intelligent research, a process of enquiry which renders it imperative that an experimentalist be well grounded in theoretical knowledge, without which his labours are prolonged. Disappointments become more frequent, and often conclusions arrived at are illusory, or at least ill grounded, for although the most plausible theories might possibly be inferences incorrectly drawn, still such must form the stepping-stone by which the track of knowledge is pursued, it being a well-tested axiom, that truth is reached only through a graduated channel which diverges from the contractions of error to the broadest array of probabilities that may be safely accepted as proven truths.

It has been a practice, persistently followed of late, by some photographers, to smile derisively at theoretical elucidations, and to evince feelings of impatience when speculative subjects are mooted in their hearing. Such confined notions would be too absurd to deserve notice were it not for the remarkable fact, that exclusionists such as these are usually the first who pounce upon a new discovery after it has been worked out by a mind well grounded in theoretical knowledge, and whose labours were based on a pre-existing supposition derived from such information, or perhaps some proved fact lighted on in an obscure corner of chemical science.

In reply to such who regard manipulative skill as the only object worth consideration, we say, mechanical appliances and finger adroitness have, in photographic operations, already reached a high state of perfection; it therefore becomes an imperative duty to bring into exercise a higher range of thought, by seeking out the *Reason Why*—to allow the mind to journey through the comparatively untrodden path which proceeds from effects to causes; and until such a course is followed, feverish expectations will be indulged in, fallacious notions entertained, and photography as a science will remain imperfect.

I readily accept the objections concerning hidden mysteries which might here be raised, but notwithstanding the profound secresy sometimes observed by nature when causes are sought after, sufficient might be arrived at to answer all practical purposes; in proof of which, an incontrovertible example is provided by the present position of electrical science, which holds mastery over a subtle fluid whose origin and cause of continued existence still remain unknown.

Turning my remarks into a more congenial channel, I resume the subject of continuity commenced in our introductory article, by offering a few remarks on actinism and the probable nature of its operations when their influence is brought to bear on the sensitive salts of silver; the results in this place being considered as the formation of a latent image supported by an inert vehicle, such as represented by collodion.

The power of decomposition exercised by solar light has long been known, and more recently, its influence on vegetable germination has been discovered; but as yet no satisfactory conclusions are arrived at concerning the nature of actinic rays, nor is it possible for us to offer here any solution of the problem. Apart from the arguments provided by the well-sustained theory of chemical electricity, which to my mind appears the only road by which an understanding can be arrived at, the striking resemblance in results produced by light and electricity is sufficient to warrant the propriety of our choice of views pertaining to the subject. But without entering into matters which would occupy more time and space than can be spared for such purpose, I at once proceed to an exposition of our ideas on the formation of a latent image by the action of ray power on the iodide and bromide of silver.

By basing my remarks on the electric theory, I presume actinism to be magnetic action in its simplest form, whose power, when employed in producing a latent image in the camera, is regulated by the proportionate quantities transmitted through the lens with the light reflected in the several colours that belong to the represented object.

The evanescent picture so produced may be likened to a transparent positive, through which the actinic rays pass by gradatory transmission to work out a foundation on the sensitive plate for a permanent superstructure, which comparison is made strikingly evident by a brief consideration of the effects produced. White conveys the chemical rays in their undivided power; the violet and blue differ only to a slight extent from the results produced by white; yellow, but for white rays reflected, is inert; and reds owe their scarce less feeble action to a similar cause. Now arises the query,—In what manner do the actinic rays act upon the sensitive media?

Adhering to the electric theory, we assume a position which is borne out by the writings of that prince of chemists (Berzelius) whose researches in chemical electricity form the groundwork to our premises. I regard iodide of silver as a perfect conductor, and the bromide an imperfect one; but, for simplicity sake, I shall dispose of the iodide salt first, conceiving the metal to represent the positive, and its companion, iodine, the negative properties. It will be seen that under such conditions these two elementary substances, when united, form a conductor to the magnetic fluid, which, in its passage, causes decomposition; that continues until the conducting chain is broken by the partial loss of iodine; which, when liberated, re-forms the source of conduction by joining itself to free nitrate, without whose aid disunion cannot occur, as decomposition and recomposition necessarily follow each other—a law admitted to extend even to the separation of the elements of water by means of electricity. It must be admitted that where the strongest currents are admitted, the reduction will be most complete, and *vice versâ*. Seeing that iodide of silver forms the most perfect conductor, it should prove the most active in creating a latent image, and the most energetic in the exercise of magnetic influence on the superstructure (for we believe the partially decomposed atoms, whilst hanging in a balance, retain an attractive excitement). Experience has fully proved such to be the case, for it is a well proved fact that iodide of silver, when associated with a strictly pure collodion, is highly sensitive when exposed to light, and so energetic under the process of development, that streaks and stains can only be avoided by skilful manipulation; to avoid which, as well as for other advantages its use confers, the bromide of silver is introduced to associate; and the *reason why* the last-named salt effects beneficial results becomes now a subject for enquiry.

Silver, as before observed, is an electric conductor, but bromine conducts the fluid imperfectly, if, indeed, it conducts at all; so that in the absence of organic matter from the collodion, decomposition would proceed slowly, although by the reasoning of analogy I believe the salt retains magnetic excitement to effect the object of development; but the film of magnetized bromide, receiving no increase of atoms from decomposition, must necessarily form a weaker latent image, and would bear longer exposure without a liability to stains or fogging during after-development, by reason of the comparatively feeble attraction brought to bear on that process of constituent separation, which suppositions must be received as almost confirmed facts, if proofs are sought in actual experience, it being well known that a bromide is added to collodion as a corrective, to preserve detail or to insure clean results, which service it performs probably by proximity that divides the more sensitive and energetic atoms of iodide of silver.

Admitting the presence of the iodide and bromide salt, in mechanical combination or apart, in either case intensity depends on actinic energy; it therefore becomes evident that harmonious lighting of an object is necessary to preserve natural gradation of tones, and unless such is provided, the action of light will, under certain conditions, reverse the required result, for by throwing a mass of vivid light (say, for example, on a lightish red coloured object), and allowing a whitened portion to remain in deep shade, the former will produce an equal if not a deeper deposit on the plate than the latter, on account of the strong flow of white light reflected; and in addition to the above apparently paradoxical fact, I direct attention to the question of exposure.

To produce the requisite effects upon the sensitive salts of silver requires a certain amount of energy to be expended by the magnetic rays; therefore, except care is observed in lighting, the portions of the picture that transmit the greatest amount of energetic ray power will cause a disproportionate thickening in such parts of a negative, while the details of shaded portions remain comparatively unacted upon; in such an instance, a negative innocent of natural gradation is produced, results which similarly follow under exposure; but it not unfrequently happens that solarized or over contrasted negatives owe their soot and whitewash, or other defects, to the injudicious employment of a short focus lens on a brilliantly illuminated object, without the precautionary diaphragm to soften the reflected rays previous to their admission in the camera.

Summarizing the remarks already offered, we learn that during development, reduction proceeds most vigorously where the actinic rays have expended the largest influence, graduating from such portions to the deepest shades, that melt into actual transparency; and when the whole details are tenderly secured, free from the sacrifice of any of its parts, a perfect negative is produced; but such results where lighting is comparatively beyond control, as in landscape work, are seldom arrived at, because of the length of exposure necessary to obtain the pencilling of detail in the shadows. It has occurred to me, while writing the present paper, that a weak silver bath used for sensitizing would wonderfully improve effects under the conditions last described, more particularly if development is conducted on a levelling stand, allowing the preferable gelatine and iron to work undisturbed; for having shown that the greater reducing force will operate where the strongest light has acted, it seems to me, that by presenting a small quantity of silver that must be locally expended ere the attractive force is satisfied, would prevent over-piling, at the same time permitting the lower range of details to appear in their necessary degrees of gradation and vigour, a matter of no small importance when strong contrasted scenes are offered to the camera.

It is to me a matter of extreme regret that circumstances compel me to conduct experiments at present by a mental instead of a practical operation, but as I proceed I hope to offer particulars which might guide the labours of my more favoured brethren who take an active interest in what, to myself (even by mental exercises) has been a highly interesting subject; but having now proceeded beyond the usual limits, I must leave the matter for future treatment in my next, when remarks of a practical character will explain many a reason why that troubles arise under the operation of development.

STEINHEIL'S PERISCOPE AND E. BUSCH'S PANTOSCOPE LENS.

BY P. REMELE.

Opticians have for several years been making the most strenuous efforts to construct a landscape lens with a large angle of view. There have appeared Harrison's globe lens and Dallmeyer's new landscape lens, which have already enjoyed considerable popularity.

Steinheil, of Munich, has lately come before the public with a new lens, called "Periscope," which attracts general attention, on account of the size and correctness of the pictures taken with it. The field of view of this lens amounts to 90°, and in the diagonal 110°. The chief specimen pictures of the periscope are two well-executed photographs, 30 inches by 22, by J. Albert, of Munich, representing the inner and outer view of the Industrial Palace in Munich. The outer view, taken with periscope No. 7, is the best. The sharpness is sufficient, although nowhere excellent. The interior, taken with No. 6, is indeed almost destitute of sharpness, especially at the edges; nevertheless, this print also makes an excellent impression, especially on account of the exceedingly correct delineation and the perfect parallelism of the lines. We are sorry that we cannot say much about the lens itself, as we have not yet got a specimen of it.

About the same time that Steinheil published his circulars, Emil Busch, of Rathenow, constructed a kind of globular lens, which serves the same purpose as the periscope. This new lens, which bears the name of pantoscope, is a double lens with two *achromatic* lenses; and in this respect, therefore, different from Steinheil's periscope, which consists of two simple crown-glass lenses (see above). Both lenses of Busch's pantoscope are exactly alike, and very convex. The form of the glasses—to describe it approximately—lies between the spherical and the oval. The experiments which I made, by order of Herr Fred. Beyrich, gave the following results :—

The pantoscope possesses an angle of view of 95° in the rectangle, 3 : 2; in the diagonal, an angle of 105°. The lens which I tried had a diameter of 17 lines,* and a focal distance of 9¼ inches, reckoned from the central stop. By the employment of a stop of 3 lines,† it drew with exquisite sharpness to the very edges a picture of 16 by 20 inches, or one of 14 by 21 inches, without any distortion. With a sunny view the time of exposure was 1¼ minutes, and the picture was very much over-exposed; in the shade, an exposure of 1¾ minutes was amply sufficient. The field of view is almost the same as in the periscopes Nos. 2, 4, and 7 of Steinheil's circular; but the actinic power is, at all events, more considerable. For example, the periscope No. 7 requires, for a picture of 30 inches, a stop of 2 lines; the pantoscope, on the other hand, for a plate of the same size, requires a stop of 4 lines; showing that the latter possesses at least four times the actinic power. The periscopes Nos. 1, 3, 5, and 6, which possess greater strength of light, have also a smaller angle of view than 90°. Very strongly in favour of the pantoscope is the exquisite sharpness of the pictures produced with it, which—at least, to judge from the examples before us—far surpasses that of the periscope pictures.

In No. 15 of the *Photographic Mittellungen*, J. H. Dallmeyer, of London, assigned the following five qualities as necessary for a perfect landscape lens :—(1) A field of view of 90°; (2) flat field; (3) correct delineation to the very edge; (4) avoiding of the dark spot in the middle of the negative; and (5) that the opening of the stop should amount to at least the 30th part of the focal distance.

In the pantoscope the angle of view of 90° is exceeded; the field is almost perfectly flat; the object glass gives no distortion, and has—at least, in my experiments—*not* shown the dark spot. The fifth condition is also fulfilled; for example, the pantoscope of 17 lines, with adequate sharpness, has a stop of 3½ lines, and a focal distance of 9¼ inches.

In the employment of the pantoscope it is indispensably necessary that the ground glass should be exactly parallel with the front wall of the chamber, and stand exactly vertical. If these conditions are not fulfilled, a misdrawing arises.

Berlin, October, 1865.

[Dr. Vogel sends us examples of the work of this lens, and writes as follows :—"The pantoscopic pictures which I send you are perhaps not, in all parts, perfectly sharp. The reason of this is, that the printing lasted five days, on account of the great density of the negative and the dull weather. During this time the positive paper contracted somewhat. You will have already learnt that the periscope had a *chemical focus*." The pictures have undoubtedly the amazing angle described; but, possibly from the cause mentioned, there is a want of crisp sharpness everywhere; and also the indication of the troublesome central spot of light so difficult to avoid in such combinations.—Ed.]

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ON THE COLOURING OF PHOTOGRAPHIC PROOFS BY MEANS OF POLARIZED LIGHT.

The phenomena of colour produced by means of polarized light constitute one of the most beautiful sights in experimental physics. The richness and splendour of the tints thus obtained have created the desire of seeing them applied to drawings of natural objects; birds butterflies, and flowers have been figured on glass plates, by means of plates of mica and alabaster judiciously selected, and these plates, traversed by rays of polarized light, appear clothed in the most brilliant colours when looked at through an analyzer. This kind of coloured designs is necessarily very limited; it has occurred to us that we might arrive at more complete results by combining it with photography, and at our first experiments we succeeded in obtaining very excellent effects.

To colour an engraving or shaded lithograph, it is sufficient to apply flat tints to the plate. We follow an analogous process to colour a photograph on glass (transparent positive) by means of polarized light. Some plates of mica, of suitable thickness and placed in position determined by the position of the plane of polarization, are fastened, by means of isinglass glue, behind the photograph, after being cut according to the outlines of the subject. Each plate furnishes a flat tint appropriate to the part of the photographic proof behind which it is placed, when this proof is looked at through an analyzer. Upon making the analyzer turn upon the axis of the tube which contains it, the tints vary in intensity, disappear, and are afterwards replaced by complementary colours. We can thus pass from a colouring which reproduces the natural tints to another forming a caricature, if the subject of the photograph admits of it. In a portrait, the rosy tint of the complexion becomes green; a blue dress appears orange; a violet gown becomes yellow, and *vice versâ*.

Those who are familiar with experimental physics will understand how to proceed from what is said above. To those who are not, we will point out in a practical manner the method of constructing, very easily and almost without cost, the instruments necessary to realize the experiments in colour now under consideration.

We must first obtain a ray of polarized light. Place horizontally, before a well lighted window (but which does not receive the direct rays of the sun) a plate of window glass covered with black varnish, or applied to a sheet of glazed black paper. All the rays which arrive upon this glass plate under an inclination of 35° 25′ are reflected at the same angle and *polarized*. A piece of highly varnished black oil-cloth also polarizes light very well.

If the photographic proof be placed so that the glass plate upon which it is taken makes, with the plate employed as polarizer, the complementary angle of 35° 25′, the plane of the proof will be perpendicular to the rays of polarized light, the parallel rays of which traverse the proof.

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* About one and a half inch.—Ed.

† About a quarter of an inch.—Ed.

Let us now construct our *analyzer*. This instrument is constructed of a cardboard cylinder, into which eight or ten plates of thin glass are introduced, placed one upon the other, and inclined 35° 25′ to the axis of the cylinder. It will be found convenient to previously place the pile of glasses, inclined, as we may say, in a hollow rectangular parallelopiped of blackened cardboard, which is afterwards introduced into the cylinder. One end of the cylinder is fitted with a cap pierced with a circular aperture of 0·15 to 0·20 in diameter, against which a convex lens may be placed. This eye-piece, for which a spectacle glass for a long-sighted person answers very well, is not indispensable. The pile of glass must be placed as near as possible to the eye-piece.

Looking at the photograph through the analyzer, directed so that the axis of the cylinder lies in the direction of the polarized rays, and turning the cylinder slowly round upon its axis, we observe that there exists two positions of the pile of glass, diametrically opposite, in which the field of the instrument is sensibly darkened. This fact proves that our arrangements have been well made, and that a ray of polarized light passes through the photograph.

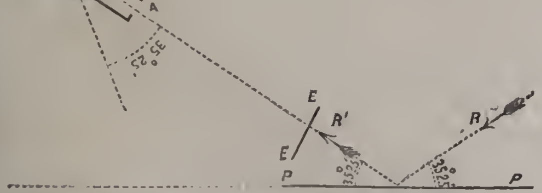
Place upon the photograph some plates of mica of various thicknesses, and renew the examination by means of the analyzer. We observe that in certain positions of the instrument the plates of mica are coloured in tints which vary with the thickness of the plates, and which are more or less intense according to their position with reference to the analyzer.

Reverse the manner of observing: make the instrument fixed, and turn a plate of mica while holding it close to the proof. Each plate will thus furnish two complementary colours, each of different intensity. When the plate of mica under trial presents the tint suitable to the part of the proof upon which it is applied, hold it there, and trace upon the mica the outline according to which the plate must be cut. This operation will be repeated for each portion of the proof which we desire to colour; then the plates of mica, cut out with sharp scissors, are glued behind the proof.

The tinting power of the mica plates begins when their thickness does not exceed the 346-1000th of an inch; when thicker, they remain white. When too thin they also lose the property of tinting.

We can furnish a stereoscope with analyzers by means of which very original effects may be obtained. The two stereoscopic pictures being furnished with plates of mica accurately placed, each picture may be examined with analyzers giving natural colours; in this case the picture in relief will also be tinted with the same colours. If one of the analyzers be turned so as to give complementary colours, each eye will see a differently tinted picture, and with both eyes a picture in relief will be seen, the colours of which will have nearly disappeared.

We conclude by intimating that the angles indicated for the arrangement of the polarizer, the picture, and the analyzer, must be realized with much exactness, else the effects will be sensibly affected. We succeed at once when we employ very uniform mica plates.



Note.—Any analyzer that gives but one image will answer. Those based upon the properties of a bi-refringent crystal cannot be employed, because they give two images.

References to Cut.

PP Polarizer { length, $1\frac{6}{10}$th inch
breadth, $\frac{64}{100}$th ,,
AA Analyzer { length, $\frac{6}{10}$th ,,
diameter, $\frac{16}{100}$th ,,
pp Pile of glass plates.
EE Photograph on glass.
R Incident rays.
R′ Polarized reflected ray.

Bulletin Belge de la Photographie.

◆

A NEW COLLO-DEVELOPER.

BY E. A. KUSEL.*

The following is a formula for a developer which produces the best results of any that I have seen :—

Sulphuric acid	4 ounces
Water	8 ,,
Glycerine	4 ,,

Mix the acid and water, let cool, then add the glycerine and the iron filings, set in a warm place, and in a few days, after repeated agitation, a mass of crystals will be formed in the bottom of the dish. Clear off the acid and take out the filings, then take and dissolve one ounce of the wet crystals in eight ounces of water, and neutralize the remaining acid in the solution with carbonate of ammonia, so that the developer obtained will be slightly acid; then filter well, and the developer is ready for use. No alcohol or acetic acid is used, no longer time of exposure is needed, and I think this is the developer needed to get good, clear, bright, and intense negatives. I hope the Professor will be so kind as to try it, and if not found wanting, give it to the fraternity through your valuable Journal, from which I have learned so much, and which is doing a good deal in advancing photography.

◆

HOW TO COAT GLASS WITH ALBUMEN, ETC.

BY LE ROY GATES.†

Considering the American Journal the legitimate medium of photographers in this country, in order to obviate the necessity of replying to many letters similar to the one enclosed, with pleasure the following information is submitted for consideration. The successful mode of coating glass with albumen to give best results, as simple as it may seem, depends upon certain important conditions.

The white of a fresh egg (for no other will do), is beaten to a white froth, then added to ten ounces of pure soft water, when it is well filtered through paper or clean water.

This coating solution will keep some time in cold, but only a few days in warm weather. After it begins to decompose it is not fit for use; for in this condition various freaks of streaking, &c., will appear, generally resulting in the derangement of the bath.

The glass is soaked in a jar of acid water (6 gallons water and 4 ounces nitric acid), for ten hours or more, and then washed and rubbed with a cloth in a clean pail of water, and finally the concave side of the glass selected, and well rinsed under the tap, when it is flowed with the albumen in the same manner as flowing a plate with collodion. The glass is now placed in a vertical position on one corner, and allowed to dry where there is no dust.

The glass properly washed, the albumen flows over the surface as smoothly as collodion. Should the coating flow unevenly, leaving spots uncovered, the glass will have to undergo a second washing to remove the acid, which produces this greasy appearance, the cause of it. When dry, the opposite side of the plates is cleaned with, first, a moist, and then a dry piece of cotton flannel, when they are put away in a box in a clean room, out of the way of chemical influences, where they will keep in good order for months. If kept in the dark room, or chemical department, where cyanide, hypo, and other chemicals are used, the plates will be fit for use only four or five days.

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* *Humphrey's Journal.*

† *American Journal of Photography.*

By strictly adhering to these rules in the use of albumen coating in connection with the ferro-albumen developer, no finer results in the production of the negative, I think, can be accomplished in our present condition, and not the least injury will perceptibly occur to the bath in its use.

On account of the decomposition of the albumen in the ferro-albumen developer after a short time, I keep the albumen and developer in separate bottles, and mix enough for a day's use. The amount of acid is not too much where alcohol is dispensed with. However, in this respect, every operator must use his own judgment.

◆

SOLAR CAMERA WORK.

The following is one of the formulas for solar work used in the first-class establishments in France; for sensitiveness and rich tones it cannot be surpassed:—

Salting Solution.

Water	1 ounce
Chloride of sodium	18 grains
Fluoride of ammonia	1 grain
Iodide of potass	1 "
Cyanide of potass...	1 "
Liquor ammonia	2 drops
Gelatine	10 grains

Silver Solution.

Water	1 ounce
Nitrate of silver	30 grains
Lemon juice	10 drops.

Developer.

Use a saturated solution of gallic acid.

Fix in a weak solution of hyposulph. of soda.

Tone in a weak solution of chloride of gold and uranium, adding about a teaspoonful of bicarbonate of soda.

J. H., in *Humphrey's Journal.*

◆

Correspondence.

THE "BRITISH JOURNAL" ON THE CHEMISTRY OF DEVELOPMENT.

Sir,—The evasive "replies" with which the "British Journal" has endeavoured to upset my objections to their leading article of January 26, 1866, are scarcely calculated to settle the matter in dispute. Confining my remarks to the chemical questions, I shall treat of some of their "replies" as follows:—In the first "reply" we read, "Many hours' boiling with diluted sulphuric acid is required for the conversion of gelatine or glue into glycocine." "Many hours' boiling with diluted sulphuric acid is" *not* "required for the conversion of gelatine or glue into glycocine." I have obtained that salt in crystals from a solution of these substances which has been boiled only a few minutes. Glycocine was first obtained by the action of cold concentrated sulphuric acid upon gelatine. I find in a chemical work of authority that glycocine is formed by the action of dilute sulphuric acid upon gelatine, without any reference to boiling.

In another "reply" we read: "The main objection raised by us, *not* that silver having given up oxygen to one substance cannot seize it from *another*, but that silver, contrary to its nature, having robbed acetic acid of oxygen, would not *probably* forthwith restore the oxygen and reproduce acetic acid." I will quote the passage of the former leader to which I objected:—

"The silver, after relinquishing the oxygen which it already holds when in combination with nitric acid, immediately changes its sentiments of affection for that body, and violently seizes, from a chemical compound, some oxygen to which it is not entitled." In this passage I see no *mention of silver restoring oxygen to acetic acid.*

There is a good chemical authority for the decomposition $Ag\ O\ Ac\ O_2 = Ag + Ac\ O_3$, and therefore the whole point of the answer in the "British Journal" is, that silver cannot absorb oxygen from acetic acid. This effect, I have already pointed out, may be traced to the fact that the silver is in the *nascent* state, of which more in its place.

I never said that "NO_4, having yielded up its 2O and produced $2HO, SO_3$," could "afterwards retake it from the $2HO, SO_3$," but I may remark that an equation may serve to "illustrate the very opposite" of any position when applied to the *wrong* argument, as has been done in this case by the *British Journal.*

To return to the consideration of the nascent state. In the next "reply" we read: "Nascent state is often a very convenient expression for purposes of mystification." From this remark we may, I think, fairly infer that the "British Journal" *is* mystified by an "expression" to be found in the most elementary treatise on chemistry, and understood by the "merest tyro" in scientific attainments. We next find: "Mr. Cherrill must know that a body in the nascent state is never more energetic than the agent which makes it nascent. I certainly was *not* aware of this before, nor do I find any authority for the assertion. To quote from the most elementary work on chemistry on which I can lay my hand,—"Bodies in a nascent state often enter into new combinations, which cannot be formed under other circumstances" ("Text-book of Elementary Chemistry, for the Use of Schools and Junior Students," by J. P. Bidlake, page 20).

In the same reply, we find the statement: "Sulphate of iron cannot deoxidize acetic acid." It is well known that, on the contrary, sulphate of iron solution both can and does deoxidise acetic acid, when the two are mixed, so as to form an ordinary developer. I may here remark that the same will take place in a bottle filled quite full, and fastened down air-tight, which precludes the idea that under ordinary circumstances the atmosphere has any essential effect in causing the formation of peroxide of iron in the developer.

In the next reply, we have a somewhat curious blunder. We read: "Mr. Cherrill *did* attribute a property the reverse of that known to belong to it [oxide of silver]. He supposed it might be formed by robbing aldehydic acid, when in the state of acetic acid, of its attached oxygen."

It is not usual to speak of "formation" as a "property." I did not "suppose" that oxide of silver could be formed without silver. A writer who would say "aldedydic acid when in the state of acetic acid," I suppose would say hyponitrous acid "when in the state of nitric" acid; such an expression would at least have the advantage of extreme novelty.

Of the "eighth reply." Of course if glycocine is *not* present in the developer, it is not necessary to enter into any argument as to its effect as an oxidizer of that solution; but I may remark that the manifest oxidation of the developer cannot be more traced to the influence of the atmosphere when glycocine is present than when it is absent. Moreover, I said in my paper, "glycocine, or the compound of it"—meaning, as any one might see, the solution made with gelatine, sulphuric acid, &c., before mentioned.

As far as it is necessary to notice the "ninth reply" (which in itself involves a contradiction), the same remark will hold good, viz., that "*the ease*" with which "glycocine, or the compound of it, gives off oxygen," is shown by the rapidity with which the developer to which it is added is oxidized.

No argument has been urged against the equations

$$3\,Ag\,O\,NO_5 + 6\,Fe\,O\,SO_3 + 3\,Ac\,O_3\,HO$$
$$= 2\,Fe_2\,O_3\,3\,SO_3 + Fe_2\,O_3\,3\,NO_5 + 3\,Ag\,O\,Ac\,O_2 + 3\,HO,$$

and

$$Ag\,O\,Ac\,O_2 + HO = Ag + Ac\,O_3\,HO.$$

In conclusion, I have to apologise for the length of this communication. I may add that, as my paper was written with a view to invite consideration of, and, so far as I could, throw light upon, a subject which had not received sufficient attention, I have replied to the *British Journal* less from a love of controversy than from a desire to prevent misconceptions and to dissipate fallacies which, however frivolous, might mislead some readers. As no further useful end can be answered by continuing the controversy, I shall not think it necessary to notice any other remarks they may make on my paper or on the subject generally.—Yours, very truly,

Nelson K. Cherrill.

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Photographic Notes and Queries.

Suggestion to Camera Makers.

Sir,—Will you allow me to suggest what I think would be a great improvement in focussing glass frames for portrait cameras? for how often it has happened to myself, and no doubt to others also, to find, that when the carte de visite or other negative is taken, the head of the figure is too high or too low, or perhaps too much on one side, when we have trusted to the usual pencil-marked lines generally used to guide us to the size of the plate required! Then if we use a piece of cardboard with the size cut out, it looks an unsightly affair, and perhaps we may crack the focussing glass by driving pins or tacks in the corners of the frame. Could not the camera makers supply us with a set of inner frames cut the various sizes that the camera is intended to take? They might easily be fastened in by small brass buttons, so that one size could be easily substituted for another; they could be made of polished mahogany to match with the camera.—Yours truly,

Swansea, Feb. 28th, 1866. Thos. Gulliver.

Gelatino-Iron Developer.

Sir,—I have never been able to understand how the irritating edgings and patches on plates developed with the gelatine and iron solution are disposed of uniformly; I have over and over again had negatives, when drying off the varnish, suddenly appear edged round the arms of the figure and over the background with a denser deposit, and have been only able to restore the negative sometimes by flooding with alcohol, or revarnishing; and even when successful, it is only an imperfect result. I think that the use of this developer demands a more accurate timing of the exposure than the iron solution alone does, and I find that sugar in the solution with gelatine seems to give more immunity from these vexing marks, so far as a day or two's experience goes. It is somewhat a remarkable, and to me an unexpected result in using benzoic acid in the developer, that it should have such a powerful restraining energy; as little as ⅙th of a grain in an ounce of a 20-grain plain solution of iron seems amply sufficient to enable one to develop a picture. Benzoate of ammonia is like it also. Whether any advantage accrues by its use is uncertain; the development seems rather peculiar, spreading all over the plate laterally from a commencement.—I am, sir, yours, &c.,

Egham, March 6th, 1866. Wm. Bartholomew.

The Edinburgh Society.

Sir,—Your able contributor, the "Old Photographer," in his last "Echoes of the Month," mentions the proceedings of the Edinburgh Photographic Society, and states that the Chairman, speaking of the Wet Tannin Process, "said that failures with this process were only what he expected; and other members echoed the remark."

Now this, like most echoes, is decidedly vague, and would lead one unaquainted with the true state of the case to infer that this was the general opinion of the members present. Any one reading the report will see that other members resolves itself into two, one of whom had not tried the process. —I am, your obedient servant,

Edinburgh, March 6th, 1866. Edwin Musgrave.

[Turning to the report to which our Correspondent refers us, we find it more than confirms the statement of the case given in the "Echoes." In the said report we find that Mr. Musgrave himself described his results as "very unsatisfactory." The Chairman said that this unsatisfactoriness "was only what he expected." Mr. Nicoll thought that the process "was a mistake," and that "the sooner it was classed amongst the thousand-and-one whims and fancies that are best forgotten, the better." Mr. McGlashon "might sum up all he had to say in one sentence—he did not believe in it." Mr. Bow had not tried the process, but "thought that what was really wanted was a method of rapid development," and recommended members to "turn their attention to try to get at that." With all these opinions against the process, there is not one opinion reported in its favour. It must be understood that we are not discussing the subject, nor offering any opinion upon it, nor was the "Old Photographer." He merely recorded facts, and we simply quote the authority to which Mr. Musgrave referred to confirm these facts.—Ed.]

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Talk in the Studio.

Mr. Swan's Actinometer.—We have pleasure in announcing that Mr. Swan will read a paper on his new Actinometer, by which the exposure in carbon printing is freed from uncertainty, at the next meeting of the London Photographic Society, to be held in King's College, on Tuesday evening next.

Methylated Spirit.—We learn that the United Association of Photography, 213, Regent Street, possess a licence for the sale of methylated spirit, as well as the firms referred to in our last.

Photography in the County Court.—Mr. Charles Knight, of Killigrew Street, Falmouth, writes to state that he was not the plaintiff in the case in Falmouth County Court published in our last, and that he does not know any photographer of that name but himself. We received the account from a correspondent upon whom we believe we can rely; and also another account from an unknown correspondent. What is the nature and source of the mistake we cannot at present say; but we will make further enquiry.

Carbon Printing.—We are glad to learn that in one instance, at least—and we hope it is suggestive of more—photographers are not so indifferent to carbon printing as we supposed in our last. Mr. Annan, of Glasgow, one of the ablest photographers we know, is, it appears, as enterprizing as he is skilful. In a letter we have just received, he says:—"I have the pleasure of informing you that I have given Mr. Swan an order to print for me one thousand copies, size of the picture 32 in. by 15 in., and another thousand copies of the same picture, size 24 in. by 10 in; and I am also prepared to print myself, by his process, as soon as he is prepared to sell the tissue; but he seems unwilling to give that until he shows the world what he can do."

Photography again in Court.—At a recent trial of a female in Troy for the murder of her husband by means of arsenious acid, Dr. Mosher, Professor of Chemistry and Toxicology in the Albany Medical College, exhibited an enlarged photograph of the crystals of arsenious acid, obtained by the sublimation of the metal arsenic which resulted from the Doctor's experiments on the viscera and tissues. The photograph was passed among the jury, and created quite a sensation. It is by such means as these that laymen may see the results of science, and judge for themselves. In two or three similar cases in our own practice the photograph has served as an intelligible medium of science and common sense.—*Humphrey's Journal.*

Artificial Marble.—Magnesia obtained by calcination from chloride of magnesium will, when exposed to the action of water for some months, acquire considerable consistency, and become hard enough to cut marble. A lamina of this magnesia of moderate thickness is translucent, like alabaster.

With this substance casts may be taken as if with plaster of Paris, only the former sets under water. A mixture of chalk and magnesia in powder, made up into a paste with water, is good for moulding, and will become exceedingly hard under water.

Plymouth Institution.—On Thursday evening, Mr. V. E. Noel, M.R.C.S., delivered a lecture on "Spectrum Analysis." It was a very successful effort, and gave great satisfaction, the explanation of some of the elementary laws of light being exceedingly interesting, as also those portions explaining its value to chemists, and how much they were indebted to it; to medical jurists, for the detection of poison and the recognition of blood spots; to the physiologist, as a means of determining the rapidity with which certain bodies are taken into the various portions of the animal economy, the length of stay, and the time required for their elimination; to the opthalmologist, who employed the spectroscope as an instrument of diagnosis in colour blindness, &c. &c.

Ecclesiastical Art.—A Correspondent calls the attention of photographers, artists, and collectors to an Ecclesiastical Art Exhibition for the Counties of Devon and Cornwall, to be held at Plymouth about the 11th and 12th of April next, under the Presidency of Viscount Templetown, C.B. It is proposed to exhibit articles of church furniture and decorations, vestments, triptychs, and other ecclesiastical paintings, sculpture, bronzes, rubbings of monumental brasses, books, prints, and photographs. The Honorary Secretaries, G. F. Jackson Esq. (Plymouth), and J. F. Mansford Esq. (Devonport) will be glad to hear from any one willing to lend articles or photographs for exhibition. Every care will be taken of the same.

Destruction of a Photographic Studio.—On Sunday evening, a little after six o'clock, a fire was discovered in the studio of Mr. W. Heath, optician and photographer, of Plymouth. The building, a detached one, was situated at the back of a house in George Street, near the Clock Tower and Chapel, and has been erected about six months. Everything was destroyed, leaving the place a complete mass of ruin. The Fire Brigade and military were quickly on the spot, and prevented a further spread of destruction. The fire is supposed to have originated from some wood sparks falling on the felt roof from the stove that was burning the day previous. The premises are insured in the Queen Office to about half the amount.

To Correspondents.

E. T. S. J.—You have proceeded somewhat irregularly in your attempts to decolourize your nitrate bath. You say you have tried "sunning, boiling neutralizing," &c. In all such cases, before either sunning or boiling, you should commence with neutralizing. As a rule, agitating with kaolin is sufficient. We generally prefer adding a few drops of a solution of common salt, and immediately agitating. The precipitate of chloride of silver formed generally takes with it the colouring matter. If, after this treatment, or after agitating with kaolin and filtering, or after neutralizing and boiling, the solution remain discoloured, there is some impurity present more than usual, and we cannot, without knowing its nature, help you.

F. L. Playfair (St. Andrews).—The letter was duly addressed and forwarded.

W. S.—The chief advantage in the double sulphate of iron and ammonia consists in its keeping properties, the crystals having very little tendency to change into per-sulphate. Many persons consider that it tends to give cleaner and more vigorous negatives than the ordinary iron developer; we have not, however, instituted sufficiently careful experiments to say, with certainty, that this is the case, although some of our experiments tended in that direction. For winter use, employ a solution containing from 30 to 40 grains per ounce; and for summer use from 20 to 30 grains, in each case adding 20 minims of acetic acid.

John Beattie.—The letter was duly forwarded.

Edwin Musgrave.—The portion of your letter referring to matter of fact we have pleasure in inserting; that relating to personal matters is unsuited to our columns, and would probably lead to unprofitable correspondence.

Lizard.—The triple lens is, in our opinion best for enlarging. 2. A head of about an inch, if perfectly well defined, will give a good enlargement of life-size. 3. Of the lenses you name we prefer C for landscapes. 4. The difference in price between a triple and a single wide angle lens for the same sized plates arises out of the fact that the latter combination consists of fewer parts and costs less to make. 5. It is not suitable for portraits. 6. When the negative is placed in an aperture of the wall of a dark room, the only light which enters the room passes through the negative, and thence through the lens forming the image, which is received on the sensitive plate in the camera. 7. Albumenized paper is not suited for use with collodio-chloride of silver. If you coat ordinary albumenized paper (containing a chloride) with collodio-chloride of silver made after our formula, you will obtain a weak, poor image, as the free nitrate of silver combines with the chloride instead of remaining as free nitrate. Immersing albumenized paper in alcohol does not coagulate the albumen. A plain hard-sized paper answers for collodio-chloride printing; that which we prefer is the paper prepared for collodion printing by the Wothlytype process. 8. It is not necessary to coat a collodio-chloride print with albumen to prepare it for colouring; but we see no reason to fear that a surface of dried albumen would readily decompose.

Bandon.—We hope shortly to be able to publish the details. We fear that in the formula to which you refer there was intentional reticence, if not misleading. We certainly have not met with anyone who has succeeded.

John G. Hyde.—Your letter did not contain the "press copy" to which you refer, nor any enclosure. We received a letter from you at the latter end of November last, which was answered in our number dated December 1st, page 576. It is probable you overlooked that answer. If you sent any other letter, we have not received it, and must ask you for another copy, in order to answer it. We answer all correspondents, whether subscribers or not.

A Six Years' Subscriber.—The art of enamelling requires much experience for securing successful results. We are not practically familiar with the art, and cannot tell you the exact heat necessary for the vitrification of various colours used. A brown may be obtained by using peroxide of manganese or calcined protoxide of iron and antimony; a black is obtained by mixing the same with oxide of cobalt. You will obtain a good deal of information on the subject from two articles in our fifth volume, pp. 587 and 603.

Gelatannic.—The spongy deposit may be filtered out, or the clear solution decanted from it.

Developer.—Of those you name we prefer No. 1 or No. 4. We prefer a neutral grey or brown for the interior of the studio. Damask velvet, repps, cloth, silk, or moreen, will answer well, and a dark blue is a good colour. If you send us an addressed envelope we can give you further information.

Marsh Photo.—Your question is a legal one, not photographic, and we are sorry that we cannot give you efficient advice. You had better appeal to the good feelings of your customer. We fear the price agreed upon was too low to permit a really well-coloured picture of that size to be produced. It is a hard case to do work and not get paid; but it is also hard to pay for unsatisfactory work. We cannot undertake to recommend any one for any class of work. The copy of the plan is very good, and the definition very satisfactory. A little more intensity in the negative would have given you purer whites, which, in a reproduction of printed matter, would be an improvement.

J. A.—The peculiar lemon-coloured spots in the prints belong to a class with which we have occasionally met, but have not been able to trace their cause. They are not, we think, the result of imperfect fixation; they most probably result from something in the paper; or, possibly, the few prints so affected have come into contact with some acid whilst they still contained hypo. The only occasion upon which we met with such spots in our own practice we found arose from particles of citricacid having fallen on the fixed print. Your lighting and photography generally are very good.

An Amateur Colourer of Photographs.—"Harmonious Colouring applied to Photographs," Newman, Soho Square. Mastic varnish is generally used for varnishing photographs coloured in oil, and answers well.

Amateur and Subscriber.—The preparation of peroxide of hydrogen is a complex and troublesome operation. It is only prepared, so far as we know, by Garden and Robbins, and is tolerably pure. It may possibly contain a trace of the hydrochloric acid used in its preparation; but as bleaching is one of its properties, it does not follow that the action you describe is due to chlorine. It ought not to affect gold-toned prints, but it is probable that sulphur-toned prints would suffer a little. It is very excellent for cleaning oil paintings. The fullest treatise on its preparation is given by Thenard, *Traité de Chimie*. The directions for its prepa- in Fownes are of course condensed, but still more extended than we could give here. In Turner's Chemistry you will find instructions which are a little more explicit. If any hydrochloric acid be present in your sample it may be removed by the addition of sulphate of silver, which will produce a precipitate of chloride of silver, leaving a little free sulphuric acid, which may then be precipitated by means of baryta.

Waterloo writes to confirm Mr. Hopwood's statements as to the value of the saccharated iron developer. It is not new, as "Waterloo" observes. We have used it and recommended it for years.

W. Ewing.—The picture on opal glass you forwarded is taken on the wrong side of the glass; the white enamel which forms the whites of the picture is really the thickness of the glass distant from the picture itself, and hence the peculiar shadow of which you complain. The opal glass is not of a suitable kind; but in all cases the picture must be taken on the flashed side of the glass. We cannot recommend any one for enlargements.

A Reader of the News.—If the design of the apparatus to which you refer is, as you state, quite different from that patented, it is not an infringement of his patent. Being intended to answer the same purpose would not constitute an infringement.

Dominico Del Re (Genoa).—In our next.

Several Correspondents in our next.

Photographs Registered.

Mr. Wm. Clark, Hawick, N.B.,
Three Photographs of Esther Faa Blyth, Queen of the Gipsies.

Mr. A. Doherty, Manchester,
Photograph of Wm. Bowker, Esq., Mayor of Manchester.

Mr. H. J. Whillock, Birmingham,
Portrait of Members (50) of B. Association.

THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHY AT THE FRENCH INTERNATIONAL EXHIBITION.

We call the attention of our readers to some interesting details in the letter of our French correspondent, M. Ernest Lacan, in regard to the position which will be occupied by photography in the International Exhibition at Paris, in 1867, both as regards the display of examples and the practice of the art. The exclusive right to photograph the contents of the building has been secured, it appears, by M. Pierre Petit, a photographer of considerable skill and celebrity, who will doubtless do justice to the important monopoly he has secured. We hope it will be as well managed as that in our last Great Exhibition in Hyde Park was effected by the London Stereoscopic Company. The project initiated by our esteemed confrère and collaborateur, M. Ernest Lacan, in regard to an international atelier, is an interesting feature, which will, we hope, work to the advantage and credit of our art and the photographers of different countries. Further details will be found in M. Lacan's letter, and full particulars will appear, from time to time, in our columns.

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WORKING OF MR. SWAN'S CARBON PROCESS.

We are glad to state that since our recent article on the importance to our art of a permanent printing process, we have received many communications indicating renewed interest in the question of carbon printing, several of which intimate that the one thing needful to induce practical attention is information as to the exact details upon which success depends. This exact information, however, can only be gained by experience, and as yet that experience has been acquired by very few persons. In Mr. Swan's own hands the process is now in practical and successful working, but he is so fully engaged at present as to be unable at once to supply prepared material or instructions. In his own establishment it is worked with a degree of success which few persons were at one time prepared to believe, and we have seen prints of all sizes, from cards to twenty-two inches by sixteen, as perfect in all respects as we can conceive prints to be, in many instances finer than silver prints from the same negatives. But to carry out Mr. Swan's intention fully, the materials, "nonsensitive tissue," &c., will eventually be supplied ready for use, together with such instructions as will render the operation of printing successful and satisfactory in the hands of photographers generally.

Our aim, however, in recently calling renewed attention to the subject, was to bespeak for the process more general experiment. A process rarely gets rapidly out of the experimental stage if only one or two persons experiment with it. Mr. Swan has already, as we said, attained high perfection in his own establishment, but it can be no derogation from his skill or success to say that the experience of many minds and hands may contribute to still higher success; and we are anxious to bespeak the attention of as many capable experimentalists as possible to contribute to the general stock of information on the subject, as one which will well repay their attention, both in the interest attaching to the work, and in the beauty of the results. From the letters which reach us, it appears, as we have said, that one of the chief requisites to aid this is information. In the letter which follows, this necessity is clearly set forth. We shall, therefore, take the questions *seriatim*, and answer them, so far as we can, from the best information and experience we possess. To secure clearness, we shall number the questions, and add a corresponding number to the answers.

"Sir,—In this week's Photographic News you have a very able leading article on Carbon Printing, which you urge upon the attention of your readers. You briefly state the process as it is now *worked* by Mr. Swan, but you do not give formulas. It appears to me impossible for anyone to try the carbon printing from simply reading your article, unless they have some previous knowledge of the process. (1) For instance, you do not say what kind of paper is used. (2) Of what consistency the gelatine is made. (3) What does a permanent pigment consist of, &c.? (4) What is the meaning of the remark, "the exact tint of which may vary as occasion demands, a warm black generally being chosen." (5) If this refers to the colour of the pigment, how are the various tints produced? (6) Can the silvered paper used as actinometer be bought ready prepared, or, if not, how is it prepared? (7) How is the India-rubber prepared for paper, and what kind of paper is used? (8) What consistency is the gelatine used for coating the print?"

"In fact, if you could compile a complete set of formulas for carbon printing, I believe it would be the best plan you could adopt to bring it into more general use. I put this matter thus plainly before you, not altogether for my own information, for I fancy the same questions will present themselves to other minds on reading over your article; and I have not the least doubt that there are many, like myself, who would be glad to try the carbon process if it was made quite plain to them.—I am, yours truly,

"27, *Arundel Street, Sheffield.* "G. B."

1. The quality of the paper is of some importance. It should have a smooth surface, but need not otherwise be of good quality. That which Mr. Swan uses, so far as we can judge, is a common printing paper. Its sole office is to support the gelatine and pigment in the earlier stages of the operation, and hence, if it serve that purpose, it is sufficient.

2. The proportion of the gelatine will vary with its quality. The proportion given in Mr. Swan's specification is as follows: two parts of gelatine, one part of sugar, and eight parts of water.

3. There are many permanent pigments, of various tints,

which may be selected according to taste—Indian ink, sepia, lamp black, &c., with a little crimson lake, &c., to give a warm tone.

4 and 5. The sentiment of a picture may often receive considerable expression from the tone of the print; and, moreover, tastes vary as to tones. To meet varying tastes or necessities, different pigments may be added to the gelatine: sepia would give a rich brown tone; lamp black or Indian ink a pure black tone; a little crimson lake added to either of these would give a warm or rosy tint to the black.

6. The silvered paper must be prepared fresh from time to time; but the matter is very simple. For details see Mr. Swan's paper in the present number.

7. The India-rubber solution is prepared by dissolving ten grains of pure India-rubber in an ounce of benzole. The paper should be of a smooth surface. Mr. Swan uses *Saxe* photographic paper.

8. The gelatine for mounting should, so far as we know, be of about half the thickness of that to which the pigment is added; but the proper consistency for mounting purposes will be readily ascertained by a little observation.

By means of the actinometer described on another page, the question of exposure is reduced to something very like certainty. The prepared paper, which is excited by immersion for about ten minutes in a saturated solution of bichromate of potash, is—at least, in our experience—twice as sensitive as albumenized paper. After exposure, the prepared surface, having been coated with India-rubber, is suffered to dry, and then brought into contact with the coated side of paper similarly treated; the two are then passed through a rolling press, which produces perfect adhesion. Immersion in tepid water for fifteen or thirty minutes dissolves the gelatine in contact with the original paper, which is readily removed, thus exposing to the action of the warm or tepid water, which removes the portions not acted upon by light, and develops the picture, which, after soaking and washing a little, is complete, and ready for drying and mounting as before described.

PHOTOGRAPHY ON CANVAS.

BY THE PHOTOGRAPHER'S ASSISTANT.

In pursuit of a satisfactory method of producing a photographic image on canvas, numerous experimentalists have, from time to time, expended much time and ingenious labour, but hitherto the successes arrived at are more apparent than genuine; although, in a few instances, the results have been deemed sufficiently promising to tempt a rush to the Patent Office, or, what is less excusable, to be sealed by secresy.

The method I am about to describe is merely a new adaptation of the well-known principles which belong to every phase of silver printing. Nevertheless, from the proved fact of its meeting satisfactorily every requisite condition, I am encouraged to hope that, in addition to extending the remunerative field of photography, it will also, by the saving of time and labour, prove of use to the professional painter.

An oil painting, when executed in the ordinary way, might reasonably be considered as permanent as the canvas on which the pigments are laid; and whether the artist be a Van Dyke or Van Daub, when portraiture is the object, it is specially essential that every precaution be practised to ensure the conditions for which a large outlay of money is incurred; and no conscientious artist, to save labour, would willingly expose his work to the risk of premature destruction, which disaster, I fear, must sooner or later befal oil paintings whose outlines are traced on gelatine or collodion, canvas being the foundation; for it must be admitted that a slight accident from natural or other causes will mar the beauty of the painting, as the peeling or cracking of the groundwork will be attended by the total obliteration or defacement of such portions of the superstructure.

I do not pretend dogmatically to assert that such ruinous consequences must follow the use of either of the substances above mentioned, but I do assert that a possible danger should be avoided when a surer path is opened. Such a one I now proceed to describe.

Adhering to my usual custom of explaining principles, I commence by directing attention to the substance on which the picture is to be produced.

An oil pigment, spread by means of a brush or any other way, offers a surface which is not only impervious, but decidedly repellent to aqueous solutions. It therefore needs no arguments to prove that where an aqueous silver solution is applied for sensitizing, the picture subsequently printed will be formed on the extreme surface of the paint, and that fact at once shows the necessity of deviating from the ordinary rules, by employing a much larger proportion of the chloride salt than usual, regulating the quantity by the amount of sensitiveness required; bearing in mind that the larger the number of atoms simultaneously reduced, the quicker the printing is effected.

For limited experiment, take of chloride of calcium 1 drachm, citric acid 10 grains. Pulverize on a painter's slab, or perhaps a mortar would answer as well. When reduced to a powder, add a small quantity of linseed oil (raw), and grind until the mass assumes the grainless condition of butter, when an ounce of good white lead is added, "thinning" first with a small quantity of oil; and when thoroughly incorporated with the chloride salt, reduce it to the proper consistency with spirits of turpentine. Strain through fine muslin, and apply to the surface of the canvas by the method observed in house painting. When the whole surface is coated, cross and recross the brush streaks until an even coating is secured, when the paint should be "laid off" as smoothly as possible, and the brush-marks finally removed with a grainer's badger or softening brush.

If a clean planed board or unprepared canvas is selected for experiment, it will of course be requisite that three or four coatings of ordinary white-lead paint be applied before chlorodizing; but with a prepared surface one application of the chlorodized pigment will prove sufficient, and the best results are obtained when the paint dries dead. When it dries otherwise, it proves that too large a proportion of oil was employed. A little more white lead and an increase of "turps" will make matters straight.

There are two methods of applying the silver solution (which solution, I might here mention, should be a strong one, from 70 to 80 grains): first, by floating, which is easiest; or by brushing. In either case a liberal addition of alcohol is necessary, to enable the solution to overcome the antagonistic properties of the pigment.

The sensitizing should be conducted in the "dark room," more especially when a large proportion of the chloride salt is present; because, particularly when damp, it is wondrously sensitive, so much so that a light from a small paraffin lamp will darken the sensitive compound. When dry, print under a negative in the usual way; or, should the canvas be stretched on a frame, lay a negative on the surface, adopting such means as will readily be suggested to provide for inspection while printing. For solar camera work the image would be focussed on the canvas instead of paper.

When printed slightly deeper than ultimately required, wash in plain water, to be followed by a few minutes' immersion in a moderately strong bath of salt and water, when it is ready for toning, if required, which process is effected by the ordinary means and after the well-known manner. Another slight washing, and fix in a strong hypo solution, at least three times the usual strength, for it is surprising with what tenacity the silver adheres, which circumstance I attribute to the repellent surface of paint; and I would suggest that a little methylated spirit be added also to the fixing solution.

In conclusion, I would just observe that the principles described in the present paper might be applied in various directions, and are capable of numerous modifications. Instance wood engraving, a thin coating of the pigment where "turps" only might be employed to thin the paint. Or, where extreme sensitiveness is needed, the chloride salt might form a pigment nearly of itself, using a small portion of white lead just to impart body. In short, I hope that in the hands of parties interested in canvas printing they will be induced to give the matter some portion of their attention. I have placed a specimen of the capabilities ot the process in the hands of my esteemed friend the Editor, who will doubtless offer an opinion. Whatever that might be, the example forwarded was the third print only produced by myself on canvas, and I believe it embraces all the conditions needed for such work.

[We have before stated that the print forwarded to us was in every respect satisfactory; delicate, vigorous, sharp, and perfect.—Ed.]

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ON THE NATURE OF THE CHEMICAL ACTIONS INVOLVED IN THE PRODUCTION AND DEVELOPMENT OF THE PHOTOGRAPHIC PICTURE.

No. 2.—On the Formation of the Picture by the Action of the Developer.

BY NELSON K. CHERRILL.*

In my former paper I pointed out that the development of the photographic image was the result of molecular attraction. In the present paper I propose to point out some further considerations on the same point, and in my next, which will close the present series, I shall hope to show the nature of the *chemical* decompositions which take place on the application of the developing solution.

It might be thought that the paper last-mentioned should have come before the present one, but I do not think that such an arrangement would be so good. I think that all photographers will be willing enough to allow that the effect of the developer is to place the silver in such a position in regard to the film that at any provocation it will be deposited, and this will be enough for the present considerations.

The question, what is the chemical decomposition which places the silver in such a position? has no bearing on the application of the theorem of polarization.

In my last paper I mentioned that we should probably find that the first action of a developer of gallic or pyrogallic acid would be to absorb iodine from the iodine pole of the series, and so commence the development by simply isolating the atoms of silver at the other extremity of the series. This position receives great support from a few considerations which I will now give.

First. If we prepare a plate, and, after exposure in the camera, remove the whole of the nitrate of silver from it, we shall find that a developer of pyrogallic acid will bring out some detail, even without any free silver, an effect which will not be produced by an iron developer.†

Second. All, or almost all, dry plates may be developed with a plain solution of pyro, the requisite intensity being gained by a second application of the developing solution with some free silver (nitrate).

Now, as the images in all these experiments are produced by the visible appearance of free silver on the surface of the film, and as also by hypothesis there is no free nitrate of silver either in the plate or in the developing solution, it follows, as a natural consequence, that the silver forming the image must be the result of the decomposition of some of the haloid salts in the film; and I have before pointed out that if these salts are in a state of polarization, the effect of any substance which had an affinity for iodine would be to absorb iodine, and so to liberate free siver from the other pole.

Third. The image formed by the modes of development now spoken of is very faint and thin (a "phantom image"); this would be naturally expected, as the depth to which the polarization extends has been before shown to be very small; and consequently, if all the silver from that depth were liberated, it would be but a very minute quantity, and could not produce any image of great intensity.

Major Russell has found that sufficient intensity may be gained by blackening this thin image with ammonia; but this in no way militates against the truth of the assertion that the image, when formed without the use of free nitrate, will be thin and wanting in intensity.

I took it for granted, in the beginning of this paper, that photographers would allow the effect of a developer containing nitrate to be to afford or supply silver in an unstable position; and I may here suggest, before proceeding any further, that this is the only theory on which we can account for the redevelopment either of a fixed plate or a plate which has been treated with nitric acid.

The action of a developer which contains silver in this unstable condition must next occupy our attention. I have before mentioned, that if the theorem of polarization is granted, we can see how the development of the image would take place as a matter of course on the application of a developer in such a condition. I think it is a significant fact that an image can be developed under every circumstance which would be pointed out as favourable by the polarization theorem.

The piling up of silver on the image (already formed by any means) may, I think, be taken as only a continuation of the same or a similar action as that which causes the first molecule to be deposited (I am now speaking of the case in which an iron developer is used). In a diagram in my last paper I gave the form of polarization of water as PN | HO HO | PN, in which it will be seen that PN not only stands for positive negative, but it must of necessity represent a certain state of tension, in which state the superinduced silver of the image would be placed. If a molecule of silver from the polarized iodide can attract a molecule of silver from the developer, it would seem but natural that this molecule should be able to attract another, and so on through an indefinite space. From this consideration we may, I think, fairly conclude that there is a very great probability in favour of the converse of this being true; we can almost see that if a plate is "fixed," the action of a redeveloper is to pile up the silver in positions pointed out by some molecular force, or, as I have before said, by the force of attraction of bodies for atoms of a similar nature.

Now, as this is the case when redeveloping fixed plates with dense images, there is no reason why it should not be the case in the redevelopment of the phantom image of the first development of a dry plate; and if so, I can see no reason why the same principle should not hold good in the first development of any plate with free nitrate in the developer. We have seen an analogous case, from which it may be taken as proved that no decomposition of the substance in the film on which the image is built up is necessary to the formation of an image. Seeing this, can we avoid the conclusion that the action of light in the camera results in placing the silver of the haloid salt in such a position as to attract the silver from the developer in the same or a similar manner?

But I have before shown that if the silver is placed in such a position, the other element of the haloid salt must be placed in a corresponding position; and I have also mentioned that, for the want of any other theory, we must trace the first action of the developer consisting of plain pyro to the absorption of one element of the haloid salt; that is, of the element which would, by the polarization theorem, be placed in a position to be absorbed by such a substance.

It is well known to photographers that no image can be formed on any haloid salt of silver by either the action of sulphate of iron and silver or pyrogallic acid and silver without the action of light. But when any body compounded of two elements is placed by any disturbing influence (as light, for example) in such a condition that other substances which before had no action on it have power to absorb or otherwise act upon its elements *separately*, I maintain that such a compound body must be either decomposed by such a disturbing element, or, if this is not the case, it must be placed in a state of polarity. And I have before pointed out that when any substance, such as water, is placed in a state of chemical polarity, it will be decomposed under favourable circumstances; and that under favourable circumstances the haloid salt in the film may be decomposed in just the same way; and that in ordinary circumstances the film of haloid salt is not decomposed, as is shown by the experiment which will again place it in a condition fit to receive a new image in the camera;* from which considerations I submit that the theorem I have propounded—viz., that the haloid salts of silver are capable of polarization, and that in all cases the silver pole will point towards the source of light—not only will account for the phenomena of photography, but is even necessary for the explanation of the phenomena of development.

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* Continued from p. 114.

† See Photographic News, May 19th, 1865. Leader in which our Editor describes a modification of this experiment, performed under the most unfavourable circumstances.

* As this experiment may be considered ambiguous by some, the consideration that no image is seen before development, *under ordinary circumstances*, may be taken as sufficient proof that no decomposition takes place.

After what I have said, it will be scarcely necessary to occupy space in showing how the theorem of polarization may be applied both to the complete formation and also to the development of the image formed on chloride of silver.

ON A PHOTOGRAPHIC ACTINOMETER.

BY J. W. SWAN.[*]

I beg to lay before the Society a little instrument which, I believe, supplies a long-felt want in connection with photographic printing, more particularly in those branches of it where, as in the carbon process, the result of the exposure to light is not immediately apparent. I name the instrument the "photographic actinometer" because it is exclusively designed for regulating the exposure in photographic printing. It consists essentially of a piece of sensitive photographic paper, a semi-opaque screen covering a portion of the paper, and a single mechanical arrangement for readily allowing the examination of the progress of the light's action on that portion of the paper exposed under the screen, and for bringing a fresh portion of it into position when commencing a new observation. It is intended to expose the actinometer to light simultaneously with a negative or series of negatives; and, from time to time, the table carrying the sensitive paper is pressed, so as to bring into view beneath a pane of light yellow glass that portion of the paper which has been exposed under the semi-opaque screen. When the necessary depth of colouration, previously determined by experiment, is produced, it is then known that the negatives have been sufficiently exposed.

The depth of the tint to which the sensitive paper in the instrument must be printed, in order to indicate the proper amount of exposure for a particular negative for class of negatives, has to be ascertained by preliminary experiment. When the tint is once ascertained, it is matched with one of the ten tints in the scale; and the number of the tint being noted upon the negatives, it is afterwards easy to print with uniform result by simply observing the tint of the paper in the actinometer.

When the actinometer has been used for one exposure, it is made ready for another by pushing the slide one division forward, and after five exposures the table carrying the paper is reversed, and the remaining half of the paper is then available for other five observations.

The sensitive paper is prepared in such a manner as to obtain a constant degree of sensitiveness. Thanks to the researches of Bunsen and Roscoe, the conditions necessary to be observed in order to secure this result are now well understood. They find that sensitiveness depends upon the quantity of chloride of silver in the paper, not upon the amount of free nitrate; that if paper is salted by immersion during a certain period in a solution of chloride of sodium of unvarying strength, and after drying is floated upon a bath of nitrate of silver, also of approximately uniform strength, that such paper changes colour, and assumes a tint of a constant and invariable depth when acted upon by a given quantity of light. Plain photographic paper should be immersed for (say) ten minutes in a two-per-cent. solution of chloride of sodium, and floated for two minutes upon an eight-per-cent solution of nitrate of silver, and the silver solution should not be employed after its bulk has been reduced by use to the extent of one-third.

The actinometer screen is formed of a slip of glass coated with a collodion film, and darkened by sensitizing and developing in the usual manner to a degree of translucency corresponding to *the darkest printing portion of the negatives*. For negatives of widely different densities it is advisable to have screens of correspondingly different degrees of translucency; or there may be two or three grades of translucency in one screen.

The use of a semi-opaque screen, through which the light must pass before reaching the actinometer paper, is, I believe, a novel feature in my instrument. It gives two important advantages. In the first place, it prevents the sensitive paper from becoming too dark for ready and accurate comparison of tints; and, secondly, it eliminates any error in estimating the relative printing value of weak light and of strong light.

In reference to the first-mentioned advantage, it must be observed that it is only the lighter tints, such as would be produced by a very short exposure of the paper to the direct action of light, that are available for actinometric measurement. During the necessary period of exposure in carbon printing and in ordinary silver printing, sensitive paper, exposed without the screen, would become much too dark for the indication of slight differences of photo-chemical effect.

As to the other use of the screen, I believe the experience of photographers will bear me out in the idea that in printing by a feeble light a disproportionately longer time is required than in printing by a strong light. For example, a weak light, acting (say) for a hundred minutes, does not produce the same effect in printing as light of ten times the intensity acting for ten minutes. In the case of sensitive paper exposed to the direct action of daylight, Messrs. Bunsen and Roscoe have verified the law "that equal products of the intensity of the light into the time of insolation correspond, within very wide limits, to equal shades of darkness produced on chloride of silver paper of uniform sensitiveness."

I doubt if this law is applicable in the case of sensitive paper placed under a negative. Experience in printing suggests that the darker parts of a negative are relatively to the lighter parts more opaque in feeble light than in strong; and as the printing requires to be done with reference to the darker parts of the negative, it follows that when printing in a feeble light, a disproportionately longer time must be allowed for the production of the required effect.

As the sensitive surface in the actinometer is placed under exactly the same conditions as that in the printing frame, it shows the exact printing value of the light.

MATTERS OF FACT *VERSUS* TRUTH IN ART.

BY A. H. WALL.[*]

[An apology is due to our readers for admitting into our pages a paper of such inordinate length, especially as it contains so much that is in worse than questionable taste. That it has been our custom to insert the papers of the South London Society must be our excuse. In justice to that Society we refer the reader to our report as to the mode in which such a paper was received.—Ed.]

In the course of a recent conversation with Mr. Westmacott, that gentleman pointed out the difficulties an artist inevitably meets with when speaking of professional subjects to a mixed audience, in appearing either too didactic or too technical, and the serious danger he moreover incurs of giving deadly offence to those who, although profoundly ignorant of art's qualities and principles, assume critical ability, and who would almost "rather be taxed with a crime than with want of taste."

Now, when a gentleman of Mr. Westmacott's pleasant, unostentatious, and gentle bearing, backed by all the influence the letters "R.A.," "F.R.S.," &c., attach to his name, speaks of his personal experience in this way, I cannot be surprised to find certain unjustifiable charges published against me. I am not going, therefore, to complain of these accusations, being quite prepared to accept them philosophically, as natural, unavoidable consequences. But in commencing this paper, I would suggest that those who dissent from my opinions should say what they have to say against this paper, or against myself in connection with it, *here*, where I have the fair chance of reply, and not attack me in pages wherein my letters are either garbled to suit a purpose, or are altogether excluded.* Without further introduction I now turn to my subject.

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[*] Read at a meeting of the London Photographic Society, March 13, 1866.

[*] Read at a meeting of the South London Photographic Society, March 8, 1866.

I was very glad to find the active steps towards the study of photography as an art, inaugurated by this Society, taking a thoroughly practical turn in the formation of an art library. But it is of little use furnishing literary assistance for the prosecution of artistic studies, and thus bringing together the accumulated experience of the best teachers and professors, if a taste for such things does not exist in the minds of those for whom they are provided. We must not presume that this taste is sufficiently demonstrated by the steps we have taken for procuring books, nor by the invitations we may give to artists who are kindly willing to place before us the valuable fruits of their practical knowledge or studious researches, but rather look for it in the earnestness and zeal with which information so obtained is applied in our pictorial productions. "The test of a pudding" is not in getting together its materials, or even in making it, but "in the eating." A tame, half-hearted, listless spirit of inquiry is of no use in art studies. Reality and vigour of purpose, genuine *mental* labour, and dauntless perseverance, are things which best serve the true student in every branch of science, art, and philosophy.

In my last paper I strove to show that certain photographers were apt to overlook the higher orders of art qualities, in their anxiety for mere technical excellences. In my present I desire to show that these photographers are also apt to attach undue importance to *isolated* facts—to forget that, while valuable truths are composed of *relative* facts, blending harmoniously as varied parts of one perfect whole, individual facts may be both inconsistent with each other and at variance with truth in art.

And here I shall meet the difficulties and dangers Mr. Westmacott pointed out. In extenuation, I can only say I speak on this subject as one I have given thought to for many years; and as I grant to the humblest thinker the right of speaking fearlessly and honestly what he knows, or supposes he ought to know, as the consequence of study, without questioning either his motives or his ability, so I claim at your hands a similar indulgence for myself.

Those who have read *Hard Times*, by Charles Dickens, will remember that it opens with a speech, in which Mr. Gradgrind, characteristically oblivious of one small grammatical fact and of many great truths, says:—"Now, what I want is, Facts. Teach boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts; nothing else will be of service to them. * * Stick to Facts, Sir." But the Gradgrind Facts are dead, dry facts, in a state of isolation and solitude. Every one stands in unyielding, ghastly rigidity as the equal of every other. There is no subordination, no unity of design or living purpose, in these Gradgrind Facts. They stand bolt upright, a grim, unnatural, disconnected collection, set up in opposition to feeling and imagination, with no more reference to the grand design of their origin, or the inscrutable nature of their combined effects, than they would have had if creation were indeed the thing of accident and chance some strive to believe it is.

In this beautiful story Dickens points out forcibly the folly and mischief of the matter-of-fact system in its educational, political, and domestic relations. But on this occasion I desire to controvert the opinions of the Gradgrinds, Bounderbys, and Choakumchilds of art, and to deal with the class by which they are represented in the photographic world.

I reluctantly break off here, again, to guard myself against the repetition of the accusation of being personal brought against my last paper, although it mentioned no one person's name, nor even used any one person's unpublished words or opinions. I described on that occasion, as I wish to do on this, a *class* of photographers. In the former paper I aimed at those who, under the combined influence of egotism, ignorance, and prosperity, preach up their art as infallible in its perfection, and argue for an ignoble spirit of laziness and contentment injurious to the best interests of art-photography. I am not sorry for having done so, nor will I promise never to do it again; but I wish you to remember that, although in attacking a class one must necessarily attack individuals belonging to that class, this is not what is commonly understood as being personal.

> "Many a shaft, at random sent,
> Finds mark the archer little meant."

Or one may even resemble the archer of whom it is said—

> "He drew his bow, and shot at random,
> And killed his wife for a memorandum."

For even this was excusable on the score of being a random shot.

To return to matters of fact in art. These "Factologists," as Mr. Paxton Hood calls them, set up their boasted facts in opposition, not only to "innocent and pretty fancies," such as brighten and beautify "lives of machinery and reality with those imaginative graces and delights without which the heart of infancy will wither up, and the sturdiest physical manhood will be morally stark death,"* but in opposition also to scientific truth and philosophical inquiry. Mr. Paxton Hood says:—"A variety of disconnected facts resemble the different limbs of a corpse—dead, scattered, useless; but when animated by some great controlling purpose, then every fact finds its appropriate place; it has its true relation when it is subsidiary. Philosophic system re-unites the scattered limbs, and gives them life." It is just so with facts in a picture. Every represented fact must be considered in its relative as well as in its individual character. Just as pictorial composition brings all the parts of a work of art into harmonious relationship, and thus produces a perfect whole, so truth governs represented facts. A photograph is not true merely by virtue of the facts it embodies, unless these facts are relative to their unity as *parts of the whole truth*. Just as a person may speak nothing but facts and yet tell lies, because such facts are only parts of truth, so even a photograph may, by giving prominence to imperfect truths, and suppressing all but the more commonplace facts of nature, convey an impression utterly false to nature. We have a familiar instance of this in photographs in which the grand dominant facts of light, atmosphere, and perspective, have been lost in the photographer's more vulgar appreciation of the minor fact of minute detail. But, as Burnap said long ago, in his lecture on *Original Thought*, "the present age is one of facts rather than philosophy," and hence the popularity of our Gradgrinds and Choakumchilds.

Mr. Burnap, I remember, attributes this clutching at and holding on by isolated commonplace facts, rather than gathering them together for philosophic use, to the common dislike we have to "*the trouble of thinking*." And it illustrates this view of the case, in our instance, when we find so many contemporary writers on art in connection with photography denouncing and protesting, in the pages of its journals, against every species of art-knowledge which is not of the simplest, plainest, and least difficult description. The alphabet, the whole alphabet, and nothing but the alphabet, appears to be the photographic art-creed. The orthography, grammar, and composition—the refined and subtle powers of expression and effect, which latter form the artist's life-long study, and *which meet him on the very threshold of advancement*—are ignored by the photographer as unnecessary or too troublesome. He fancies all these things are to follow, as a matter of course, the mere learning of your art alphabet. To quote printed and published words—if, like others, I may do so without incurring the charge of being personal—the photographer too often says in effect, if not in words, "I protest against the 'awe-inspiring mysteries' in which art is wrapped by some teachers: these *bewilder* the art-student.'"

And, pray, why is the beginner in art to be sent to school duly labelled, "Not to be *bewildered?*" What right has he to "protest" against the art-teaching which, from a want of thought or knowledge, he finds mysterious on the score of its being "bewildering?" Can he expect to take up that which is confessedly the most comprehensive and philosophical of studies, and master it with as little effort and as much ease as he would a sum in simple addition?

Most of us have said at one period of our existence—

> "The Rule of Three it puzzles me,
> And Practice drives me mad."

But whoever "protested" against the mysteries of arithmetic because these are "bewildering" to arithmetical students? What should we say of one who protested against learning to read because of the "bewildering" mysteries of orthography, grammar, and composition in which that art is "wrapped by some teachers"? Old Samivel Weller tells of a charity boy who, "ven he got to the end of the alphabet, considered 'vether it's vurth going through so much to learn so little,'" and concluded, "*as a matter of taste*, 'he rayther thought it wasn't.'" Those who laugh at this joke do not seem to recognize it when the alphabet of art is substituted for that of language.

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* In explanation of this remark it should be stated that the writer of this paper is in the constant habit of sending communications, to our own and contemporary journals, under various signatures, containing so much of personal and offensive matter, that it has become necessary, in our own and other pages, in consideration to the writer as well as to readers, to use the pruning-knife freely, or omit the communications altogether.—Ed.

* Charles Dickens.

It has been, and may be again, urged, that photographers have not yet mastered the alphabet of art, and that this is very simple and *not* mysterious.* Then all I can say is that, considering how frequently and continuously they have had this alphabet placed before them by a great number of different writers—artistic, photographic, literary, and scientific—they must be terribly dull scholars, not to say shamefully lazy ones. But this is not true. Photographers—or, at least, all those who are *really* art-students—*have* mastered the alphabet of art, and are now advancing towards orthography, grammar, and composition; or, to use other words, into that phase of study in which there is much to *bewilder*, much that appears *mysterious* to them. If they are now to stop short and cry out, or "protest," like children afraid of the dark, there is small hope for them, and *less for art photography*. If this Society, for instance, requires no knowledge of art beyond its mere alphabet, what folly it was of its members to vote for the works of John Ruskin being among the first books purchased for its library—Mr. Ruskin being so far in advance of ordinary art-students that it is only after much bewilderment, and the partial solving of many mysteries, that they can hope to grasp his meanings, or benefit by his teachings.

In art, effect, as most of us know, is dependent upon the harmonious blending of opposing forces by subordination to keeping, proportion, &c.; so that where we deal with conflicting elements, capable of combination by a countless number of subtle and secret methods, from which the artist may commingle or select in ways according with his primary design, we must expect to find the complex and problematical. The greatest of masters, who spent long lives in overcoming the mysteries and solving the problems of art, found these mysteries and problems thickening as they advanced. As Newton said of science, that in the whole of his busy life he had only gathered a few grains of sand from its shore, so Michael Angelo drew himself as an old man in a go-cart, to indicate that, after a long and laborious life devoted to art, he was yet but an infant in its knowledge.

But I must not waste time by addressing those who are too indolent or too self-satisfied to learn more than they can acquire without thought; for, as Douglas Jerrold said, "Daylight's wasted upon those who can see so much better in the dark."

I now come to the first and most important of the mysteries or difficulties which "bewilder" young art-students, even if they be old photographers, namely, the relative and the individual value of the facts of nature as represented in art. Whether a man be looking at the works of nature or at those of art, he sees no more than he brings with him the power of seeing. That which he recognizes in nature he will look for in art. The peasant of whom Wordsworth said—

> "A primrose by the river's brim
> A yellow primrose was to him,
> And it was nothing more"—

would not understand the artist who tried to explain his admiration for the varieties of beauty in form, colour, and composition displayed by this simple flower; he would look puzzled at a philosopher who, speaking of the design the artist detected, strove to show how, by virtue thereof, it carried away his awe-struck mind to the contemplation of the inspiring mysteries of Divine power and loving tenderness; and he would certainly be "bewildered" if a moralist, following the philosopher, strove to found on the beauty, power, love, and tenderness thus demonstrated, some grand code of laws to govern a man's acting and doing unto others. "What!" the peasant would probably exclaim—"these men must be gone fools to talk all this nonsense about a paltry little yellow primrose, of which I've crushed hundreds under my hobnails! Awe-inspiring mysteries, indeed! What on earth are they talking such nonsense about? I should like to see the primrose that could awe me!" But it is not only the illiterate who argue thus; similar ideas exist in educated minds.

When a certain fashionable exquisite visited Rome, and was shown the magnificent art-relics of that ancient city, he went over them with a wearied and spiritless expression, and, on his return, expressed his opinion of them by saying he thought—"er," he thought, "er—they were—er—they were—vewy much out of wepair!" Poor fellow! All the grandeur and beauty were to him as if they did not exist. The glories which have inspired generations of poets—the achievements which the greatest of modern artists have envied—the works which Time himself seems to destroy with a tenderly reluctant hand—were to him but rotten and dilapidated stones, cracked and time-discoloured paint. He saw this want of "wepair," but he saw no more. This was prominent and unmistakable—"a matter of fact"—they were and are, indeed, "vewy much out of wepair."

But this blindness to the extraordinary and ready perception of the vulgar and commonplace is not seen in connection with works of art only. It is probable that our exquisite aforesaid would have been just as blind to all the higher elements of grandeur and beauty in nature; that if you had pointed out to him its more subtle powers and expressions, the sublime perfection of its design, and the wonderful unity of its myriad parts, he would have heard you with the same listless, uninterested expression with which he viewed Rome's art-glories; although, being a gentleman, he would have been too polite to call you a fool for your pains. There are those, again, who could fully appreciate and admire performances which gave imitations of such facts as the cackling of geese, squeaking of pigs, braying of donkeys, &c., on the violin, who would yet turn with either weariness or disgust from Handel's *Israel in Egypt*, and other grand pieces of descriptive music. A wax figure is far more natural to some people than the finest statue in marble, simply because of the reality of the clothes put on it.

Another illustration strikes me, to be found in a good caricature. In a work of this kind the merit lies in giving undue prominence to those facts of personal resemblance which first strike the ordinary observer, such as a big nose, a wide mouth, thick lips, or what not. By isolating these from other governing facts—such as proportion, expression, &c.—the caricaturist succeeds in giving a resemblance which, although utterly false to nature, is so unmistakable, that those who would not recognize even a photograph of the individual would at once be struck by the caricature's resemblance.

To art-critics of this stamp—and, unfortunately, there are many such, especially amongst photographers—a picture is valuable in proportion to the number of ordinary commonplace facts it represents. Recognizing, as I have said, only that which they bring with them the power of perceiving, such critics are like one at sea who, beholding nothing but water, denied the existence of land. To them Turner's works, for instance, realizing, as they so largely do, the more extraordinary of nature's phenomena, are incomprehensible—mere displays of gaudy pigments. That which they were not competent to recognize in nature they are not competent to recognize in art. When they read descriptions in which Mr. Ruskin—that deep lover and close observer of nature in all her aspects—speaks of Turner's works as "glorious in conception, unfathomable in knowledge, solitary in power," they giggle and sneer; and when Mr. Ruskin describes this painter as "having the elements waiting upon his will, and the night and morning obedient to his call, sent as a prophet from God to reveal to men the *mysteries* of His universe," they only doubt the sanity of this great, thoughtful writer, and noisily rejoice in their own.

It is this class of critics who have set up the vulgar and commonplace as the standards of art in photography, and have thereby misleed crowds of worthy operators, who might otherwise have attained means of culture and enjoyment as lovers of art, and powers of appreciation and realization as practical art-students, to which they are now utter strangers. In art these "matters of fact" critics, as they delight in being called, are of all other characters most baneful and injurious. They confound all just distinctions, mistake one quality for another, degrade every person and thing to their own level, and, in short, change white into black, and black into white."*

These are the "art-critics" who are most dangerous to the true upward progress of young art-photography—critics who would fain divest it of every quality by which it may claim to rank with the fine arts; but who, at the same time, argue for its superiority over other arts, and pretend to be its best friends and warmest advocates. I do not mean to say that they always express their opinions in print or publicly; but they are numerous and powerful enough for all that, and their followers are a host in themselves.

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* A contemporary writer, speaking of the "Rules of Art," says:—"These rules are, after all, so simple, so easily learned, that it is wonderful to me photographers do not give more attention to them."

* Zimmerman.

The standard by which these critics test works of art is exceedingly simple, is very easily discovered and applied. No person, according to their belief, needs any knowledge beyond what he may have, so to speak, at his fingers' ends, to justify his boldly criticising a Raphael or a Phidias. And that, you know, must needs be very nice! Just consider how, by adopting the matter-of-fact standard, without any special thought or preparatory study, one can at once walk up to works with the fame of which the whole world has been ringing for hundreds of years, and point out unhesitatingly how worthless they are and how strangely the world's successive generations have been mistaken. To do this is of necessity extremely gratifying, and gives one a due and proper sense of one's own immense superiority. No wonder, then, that this style of art-criticism is popular.

But let us consider what these matters of fact are, and contrast them with what their advocates are apt to call matters of fancy, but which, being truths built on relative facts, are quite beyond their comprehension.

Let us first take, by way of illustration, a few different facts having regard to time. Suppose I ask one of these matter-of-fact gentlemen what an hour is: he answers, promptly enough, "sixty minutes." Well, that is a fact, and, moreover, a very commonplace or vulgar fact; but does that fact stand alone in regard to one hour? Is it not also a fact that each one of this hour's sixty minutes may have been hours to some, and its entire period as a minute to others? Will you tell me, that to some poor wretch who stands with the executioner's rope about his neck, awaiting the fall of the drop beneath him, a minute is only an affair of sixty seconds? Can you believe that a joyous hour of pleasure, in which every thought that is not full of time-speeding gaiety is banished, is equally an affair of sixty minutes? Or, to come nearer home, does it not often astonish a sitter for a photograph when you tell him he has only sat ten *seconds*, when he thinks you must surely mean minutes? Is it not the same with regard to space? Is the last mile of a long journey to a foot-sore, wearied pedestrian no longer than the first mile, when he was fresh and lively? What I want to show by these examples is, that all facts are *merely relative*, and that to take one or two isolated fragmentary facts and argue upon them, and build up theories of art, or any other theories, upon them, is to perpetuate error and retard progress.

We had an example of this kind of mistake (I speak with all due respect of a fellow-member of whom I know nothing that is not pleasant) in Mr. Werge's argument concerning perspective in backgrounds for photographers. It is a fact that what is called the line of the horizon in perspective always indicates the height of the observer's eye, and that the point immediately opposite is the point of sight, as Mr. Werge said; but it is no less a relative fact, as I stated at our last meeting, that unless you have a certain proportion of sky and landscape you get a view in the background entirely at variance with the view the camera gives. But I hold that the photographic background has nothing to do with the class of facts Mr. Werge tested it by; that, in short, it is not a matter of fact at all. Supposing it to be a landscape background, you cannot test its accuracy by the same principles by which a landscape painting would be judged, because these are antagonistic to it as a background. Just as figures in a landscape painting are subordinate to the effect of the landscape, so in a portrait the landscape is subordinate to the requirements of the painter's portrait. You cannot possibly have the same light and shade, nor the same perspective on the sitter and in the background; you cannot have the line of the horizon the same height as the lens,[*] without introducing an error more glaring than that you destroy. The painted background, however well painted, will never look like the real scene in which a real person was photographed; and it would be a rare and quite exceptional chance which gave you in any actual scene a good, effective background to a portrait, unless it was so out of focus as to be even more false to nature than a painted background would be. If, then, you cannot attain anything like deception, why attempt to deceive? Why not honestly and frankly confess that the background is simply a background? Its purpose is not to make you believe what we know you will not believe, but to make your portrait a good, artistic, thoughtful, well-designed work—standing boldly out where prominence is desirable, melting into unobtrusive shade where subordinate effects are required. A mass of gloomy cloud may suggest to the matter-of-fact critic coming rain, and form the basis of his sneers or jokes, according to his humour; but if you know that it makes the head you have created stand out from canvas or paper with the force, vigour, and reality of actual life, ask the critic to wait for the coming rain, with his best "gingham" ready for the portrait's use, and go your ways rejoicing. If, by putting the horizon of a background lower than it would be in nature, thereby giving your sitter the dignity proper to his person, station, or character, you offend a critic of this class, tell the "factologist" the latter truth is dominant, and embodies many relative facts, before which the single fact he recognizes "pales its ineffectual fires." If you introduce a piece of drapery for the colour, tone, or breadth and simplicity it gives your composition, and do not introduce a cornice with it, or show that it partially covers an open window by introducing the straight lines and angles of sash bars,[*] never mind the sneer with which the "factologist" asks you if it be "suspended from the sky;" but quietly enjoy your laugh at his expense, and let him hug himself on his cleverness peaceably.

"Factologists" are commonly and perfectly earnest and conscientious. I do not wish to imply they are necessarily the reverse. Many of them are merely men who really have not sufficient mental power to grasp other than the simplest ideas. Of these we find one in the story extant of a German soldier who was stationed as a sentinel on Margate Pier-head, one bitter winter night many years ago. A violent storm arose while he was on duty, by which the pier and a portion of the town were partially destroyed by the sea, which swept away nearly everything before it except this unfortunate German, who was found by some seamen clinging desperately to a piece of timber close to his post, nearly frozen with cold, and exhausted by the desperation of his efforts. When asked how he could be such a fool as to stay there and be drowned, he replied that he "was waiting to be *relieved*, and it wanted a full half hour of the time!" Now, with all due respect for a soldierly regard for duty, and courageous self-devotion, yet, with the writer from whom I glean the anecdote, I must say that I suspect this man, who would not stir from his *useless* post to save his own life, would not have stirred to save the whole town from destruction. He had no idea of a fact being relative and subordinate to truth. He had been told that it was his duty never to desert his post. *This* he understood. To him that simple fact was not a matter to be questioned, not a matter to be qualified, modified, or in any way reasoned about or altered by circumstances. Many art-critics resemble this soldier.

And now, in conclusion, permit me to add a few remarks by way of preface to the discussion I have intended to originate.

When "friends dispute among themselves for the discovery of truth," anything of a bitter or quarrelsome spirit in connection with their discussions must be of a mean and contemptible origin. A paltry spirit of gratified vanity on the one hand, or a feeling of mortified vanity on the other, may engender such a spirit; but in either case it springs from

> "Meanness that soars, and pride that licks the dust."

In the first case a victory is divested of honour by the paltry use it is degraded to; and in the other the bitterness of defeat begets that revengeful desire which, as the old proverb tells us, "dwells only in little minds." We should remember that if the victor has the honours of conquest, the vanquished has the more substantial benefit of escaping from error and acquiring truth.

You have been told, in certain pages, that I am more desirous of "scolding" than informing. I hope you do not believe in the truth of this; but if you do, I hereby apologize for reading the only paper I was not definitely asked to read, and readily promise never to offend again. Like the fox of Saadi's fable, I will avoid incurring the charges I am not allowed to disprove. But as some here may not have heard this amusing fable, and as it is short, I will finish my task by repeating it:—A person one day observed a fox running with uncommon speed to earth, and called out to him—"Reynard, where are you running to in so great a hurry? Have you been doing any mischief for which you are apprehensive of punishment?" "No, sir," replied the fox; "my conscience is perfectly clear, but I have just overheard the hunters wish they had a camel to hunt this morning." "Well, but that does not concern you. You are not a *camel*." "Oh! my good sir," replied the fox, "are you not aware that sagacious heads have always enemies at their heels? If an enemy should point me out, and cry, '*There runs a camel!*' they would certainly seize me without considering whether I was the kind of animal the informer described me to be or not."[*]

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[*] I should have qualified this by saying, unless the lens is not higher than the middle of the figure, or thereabout.

[*] All these illustrations are derived from one of the photographic journals, as many of my hearers may remember.

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Proceedings of Societies.

North London Photographic Association.

The Annual Meeting of this Society was held in Myddelton Hall on the evening of Wednesday, March 7th, Mr. W. W. King in the chair. The minutes of a former meeting were read and confirmed.

The Secretary then read the Report of the Council as follows:—

Annual Report.

Pursuant to their usual custom, your Committee render their Annual Report, and have to congratulate the members on the continued prosperity of the Association, and the fulfilment of the promises made at your last anniversary meeting. It will suffice to mention that there has been an ample supply of papers read at your meetings, many of them of the greatest interest, amongst which they would name those by—

Mr. G. W. Simpson, M.A., "On the Collodio-Chloride Process," and the same "On Opal Glass;" Mr. Bockett, "On Binary Photographs;" Mr. T. W. Burr, F.R.A.S., "On the Application of Photography to the Continuous Registration of Magnetic and Meteorological Phenomena, as Practised at the Royal Observatory at Greenwich;" Mr. H. Cooper, Jun, "On Improvement in Photographic Processes, and the Organic Iron Developer;" Mr. Bockett, "On the Ferro-gelatine Developer;" Mr. Ackland, "On the Modified Fothergill Process;" Mr. Hart, "On a New Printing Frame for Opal Glass;" Mr. Swan, "On a New Instantaneous Shutter;" Mr. Hislop, F.R.A.S., "A Word for Sugar in the Iron Developer;" Mr. F. Haes, "On Photography in the Zoological Gardens."

Photographic apparatus and improvements in the same have been most ably represented by—Mr. Collis, various apparatus; Mr. Ross, lenses, and numerous photographs produced by them; Mr. Springham, improved camera slides, and sliding camera and stands; Mr. How, apparatus and lenses; Mr. Woodbury, photo-relief printing; Mr. Anthony, of New York, photographs; Mr. Swan, photographs by carbon process.

To all of these gentlemen your Association tender their warmest thanks.

Although your Society does not aim at any special object in connection with the science, it has undoubtedly tended to advance the knowledge of photography in its varied applications.

Your Committee deem it but just to their labours to mention the Exhibition at the Agricultural Hall, which, so far as photography was concerned, was complete; and take this opportunity of expressing their regret that the General Exhibition was not successful.

The financial statement is satisfactory, showing a balance of £36 7s. 6d.

In conclusion, your Committee trust that the next year will prove as satisfactory as the one now closing; and that there be no lack of papers and exhibition of objects likely to prove interesting to the meetings, they again appeal to the members, that each may feel he has a personal interest in the welfare of the Association, and will exert himself to promote and increase it.

The Treasurer in Account with North London Photographic Association.

Dr.				Cr.			
To balance from last year	£31	9	10	By Journals, Rent, Presentation Prints, and Sundries	£45	10	4
„ Members' subscriptions	50	8	0	„ balance	36	7	6
	£81	17	10		£81	17	10
To balance	£36	7	6				

D. W. Hill, *Treasurer*.

Audited and found correct.
March 7th, 1866.

J. Collis,
G. Cartland, Jun., } *Auditors*.

The following gentlemen were elected members of the Society:—Mr. J. C. Belton, Mr. Arthur Bedford.

Mr. T. Burr, in moving the reception and adoption of the report, congratulated the members on the prosperous condition of the Society.

Mr. T. Ross seconded the motion, which was carried unanimously.

The election of officers next took place. For the offices of President, Treasurer, and Secretary, no new nominations were made; the following were, therefore, re-elected:—

President—C. Woodward, J.P., &c.

Treasurer—D. W. Hill.

Secretary — J. Barnett, 12, Ockendon Road, Southgate Road, N.

For *Vice-Presidents*] the following names were nominated:—G. Shadbolt, W. Hislop, W. W. King, J. J. Cole, G. Wharton Simpson, and H. P. Robinson.

Mr. Simpson stated that other duties would frequently interfere with his discharge of the duties appertaining to the office of vice-president, and he begged that his name might be withdrawn.

The Chairman said that Mr. Robinson had also declined to take office; members would therefore strike out his name from the lists placed in their hands. The following gentlemen were then re-elected as—

Vice-Presidents—G. Shadbolt, W. Hislop, W. W. King, and J. J. Cole.

Committee.—The following gentlemen were elected as the Committee for the ensuing year:—Messrs. Ackland, J. Bocket, H. Cooper, Jun., Foxlee, Goslett, How, Ross, and G. Wharton Simpson.

After a vote of thanks to the Treasurer and Secretary, and to Mr. Cartland and Mr. Collis, as scrutineers, and due responses,

Mr. Cartland said he thought that the time was now come when their Secretary ought to receive some more substantial expression of their gratitude than mere thanks. If he had rightly understood the Treasurer's statement, there was a balance of more than £30 in hand. Now, a balance like this might be compared to a heap of manure, useless when lying in a heap, extremely valuable when properly spread. He begged to propose that a portion of this balance (say ten guineas) be devoted to the purchase of some slight testimonial of the esteem and appreciation in which their Secretary was held by the Society.

Mr. Wharton Simpson most cordially seconded the motion. The duties of such an office were always exacting, and during the past year those of Mr. Barnett had been unusually onerous, at a time when his own duties and his health made the position of a secretary very trying. He believed, although this proposition was quite unpremeditated, it was one which would commend itself to every member present.

Mr. Hill (Treasurer) supported the motion, which was put, with approving remarks by the Chairman, and carried by acclamation.

Mr. Dunmore then read a paper on the "Connection of Photography with the Fine Arts."

The Chairman, in inviting discussion, remarked that, on a theme on which so much had been denied to photography, he hoped there would be a good discussion.

Mr. Simpson thought that, in a meeting of photographers, the remarks of Mr. Dunmore would meet with such cordial acquiescence that much discussion would be impossible. The necessity for art-culture was, he thought, fully and generally admitted; but the great advantage of papers like this was, that it reminded them and often stirred them up to put in practice that which they admitted, but neglected.

The Chairman hoped that such papers would induce increased art-culture, and that photographers would more and more illustrate that their art was not a merely mechanical science. He regarded the camera and lens of the photographer as he regarded the canvas, pencils, and colours of the painter, merely as tools with which to work. The real artist would produce true pictures as certainly with his photographic tools as with his painting tools: the works of such men as Robinson and Rejlander proved this; but they were inborn artists. The photographer, it was true, had not so much control over the delineation of his subject; but still he might often modify his picture by judicious management, as they were told Mr. Mudd did in some of his pictures, where, by the conveyance of a few large stones to the spot, he balanced other objects in his foreground.

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[*] Zimmerman.

After a vote of thanks to Mr. Dunmore,

The CHAIRMAN called the attention of members to three volumes of fine photographs, chiefly of Alpine scenery, by Frith, exhibited to illustrate the working of Mr. Ross's doublet lens of large angle. He also exhibited some fine photographs, taken some years ago by Mr. Sherlock, the subjects having been arranged by the late William Hunt, the well-known artist.

Mr. FOXLEE exhibited a small stereo doublet, by Mr. Ross, of three inches equivalent focus, and two card pictures taken with it. The largest stop was used, and an exposure of 40 seconds given for one during a snow storm, and from 25 to 30 seconds for the other in a declining light. He thought a still larger stop might be used without disadvantage.

Mr. ROSS said the lens exhibited was a slight modification of his ordinary doublet. The largest aperture was 1-10th of the focal length, and the smallest 1-30th; with the latter it might be used for plates 4¼ by 3¼, and with the other stops for stereo and card sizes. The back lens might also be used as a single lens.

After some votes of thanks, the proceedings terminated.

LONDON PHOTOGRAPHIC SOCIETY.

THE usual Monthly Meeting of this Society was held in King's College on Tuesday evening, March 13th, Mr. Glaisher, F.R.S., in the chair.

The minutes of a former meeting having been read and confirmed, Mr. J. Stewart and Mr. Matthew Whiting were elected members of the Society.

Mr. DUNMORE then read a paper on his Experience with the Organic Iron Developer, and exhibited some fine specimens of the results obtained.

Mr. H. COOPER expressed his interest in the paper, and his admiration of the specimens, which were the strongest evidence of the excellence of the process.

The CHAIRMAN having in some complimentary terms presented the thanks of the meeting to Mr. Dunmore,

Mr. SWAN read a paper describing his Photographic Actinometer (see p. 124).

Mr. MAYALL asked in what respect this instrument differed from that invented by Mr. Claudet some years ago.

A conversation followed, in which it was pointed out that Mr. Claudet's instrument was intended for measuring different intensities of light at different times, whilst that of Mr. Swan, as explained by himself, was a practical instrument for printing purposes, the especial point being that the test-paper was placed under the same conditions as the sensitive paper under the negative.

Mr. SEBASTIAN DAVIS said this instrument met a want long felt. It had occurred to him that as there was an acknowledged difficulty in getting paper of uniform sensitiveness for the test, the use of collodio-chloride of silver would present a means of readily obtaining a test surface in which the sources of error incident to the old mode of preparing paper would be eliminated.

Mr. NELSON K. CHERRILL suggested that as the same conditions of reduction did not exist in the silver printing and the sensitive bichromate and gelatine, the use of the screen, involving the necessity for various screens of varying density, might be dispensed with, and a chloride of silver surface with a minimum degree of sensitiveness used without any screen.

Mr. HUGHES complimented Mr. Swan on the practical efficiency of the actinometer, and remarked that Mr. Frank Elliot had in effect adopted a similar method. Having a large number of frames to expose, involving an enormous labour if each one were examined, he adopted the plan of classifying his negatives, and then examining one of each group exposed at the same time. When that one was printed sufficiently he knew that the whole of the group were done. In Mr. Swan's case the instrument was especially useful as giving at once practical value to all the bichromate processes in which the progress of printing was not perceptible to the eye.

After some desultory conversation, in the course of which Mr. Cooper said that the introduction of that instrument would probably revive the waning enthusiasm on the subject of carbon printing,

Mr. SWAN responded that his instrument was based, to some extent, on carefully settled facts, deduced from the experiments of Roscoe and Bunsen. The use of a screen was desirable from the fact that, in any mode of preparing chloride paper exposing it naked to the light, the sensitive surface would too rapidly pass to those darker tints in which it was difficult to distinguish nice gradation or change. Moreover, the instrument, as it was constructed and worked, was found efficient in practice.

The CHAIRMAN expressed his great interest in the instrument, which was one he had desired for years. He had a great deal of printing to superintend at the Royal Observatory, and the necessity for such an instrument had deeply impressed itself upon his mind. He had tried almost every variety and proportion of chloride and nitrate solutions, and had not met with any which, exposed directly to the light, did not not pass too rapidly through all the stages of colouration to be of any avail as a guide in printing operations. His friend, Mr. Claudet, who had always been willing to sacrifice any amount of time to aid him, had devised many excellent plans, but they had not quite met the case. He should at once try Mr. Swan's, which promised so well, and would let the Society know the result. He called attention to the magnificent carbon prints which Mr. Swan exhibited.

The thanks of the meeting to Mr. Swan were then carried by acclamation.

Mr. F. GOOD then exhibited and explained a simple syphon, which he had devised for removing the silver from the bath when travelling. It consisted of two arms united at the bend with a piece of india-rubber tubing, and at the end of the longer limb a piece of india-rubber tube with a pinch-cock, by which the flow of the solution could be arrested, when drawing it by the lips, without getting the solution into the mouth. It would be manufactured and sold by Mr. How.

Mr. HOOPER exhibited some very fine specimens of photography on silk, as illustrative of modes of applying them for lamp-shades, hand-screens, &c.

Mr. MAYALL exhibited some magnificent specimens of solar camera printing, equal to the finest direct from the negative in the printing frame.

Mr. ROSS exhibited some fine views of Alpine scenery, with his doublet lens, by Mr. Frith.

The proceedings then terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual Monthly Meeting of this Society was held in the City of London College on the evening of March 9th, Mr. SEBASTIAN DAVIS in the chair. The minutes of a previous meeting were read and confirmed.

The CHAIRMAN called attention to a volume of charming new Swiss photographs, by Mr. England, taken with Dallmeyer's wide-angle view lens. They were, he thought, alike worthy of attention as examples of art photography, chemical photography, and optical photography.

Mr. HOW exhibited and explained Sarony's Patent Posing Apparatus, showing its comfort, convenience, and efficiency.

Mr. FOXLEE said he had been using the new rest, and believed nothing which had been introduced into photography for years equalled this for utility to the portraitist. Sitters gained confidence and were delighted with it. Some said they could stand for a week. Even with the support for the body alone it was perfectly efficient.

Mr. LEAKE had been using one for a short time, and, taking the decision of his sitters as of great importance, all were pleased with it; the old objections to a head-rest were never made, and the most perfect steadiness was secured in the longest exposures.

Mr. BLANCHARD had been using this rest, and was struck with its efficiency in giving perfect support where it was most needed; a thing certainly not effected by the usual rest. This was also admirable in being so easily adjusted. He was altogether delighted with it, and thought that the one objection made by some, and felt by himself—the screwing to the floor—was unnecessary, as he found it quite firm without being screwed down. As a piece of mechanism it was very perfect and wonderfully cheap.

After some further conversation, in which the advantages of the rest met with universal approbation,

The CHAIRMAN remarked that the opinions of members present agreed with that expressed by Mr. Mayall, and there could not, he thought, be a doubt of the excellence of the instrument.

The CHAIRMAN then called attention to some pictures by Mr. Blanchard, Mr. Mayland, and others, to illustrate the working of a new portrait triple, by Mr. Dallmeyer, the especial object of which was to give great depth or distribution of focus, an important point in securing artistic effect in many pictures. He also called attention to a copy of Mr. Blanchard's "Zealot," printed in carbon by Mr. Swan, as an example of the presentation print which the members would receive this year. It was, he thought, a matter for high congratulation that they would receive a picture of double interest, great artistic excellence, and a magnificent specimen of carbon printing.

Mr. **Dallmeyer** remarked that the lens used by Mr. Blanchard for pictures 12 in. by 10 in. was really intended for 10 in. by 8 in. He hoped on some future occasion to describe the construction of the lens. He might in the mean time just remark that it differed from the ordinary triple, not merely in possessing a larger negative lens, but in other particulars. It was, in fact, re-constructed, and the components had different forms, diameters, focal lengths, &c.

Mr. **Howard** thought that a special vote of thanks was due to Mr. Blanchard and to Mr. Swan for enabling the members to receive a presentation print of such beauty and interest. The motion was seconded by Mr. Simpson, and carried unanimously.

Mr. **Wall** read a paper on Matters of Fact *versus* Truth in Art (see p. 124).

Mr. W. W. **King**, in agreeing in the impropriety of introducing personalities into scientific discussion, would manifest his opinion by avoiding them. He could not agree, however, with the prominence attempted to be given to certain phases of art which photography could not render, whilst its great glory—truth—was ignored. In quoting Mr. Ruskin, he did not think his spirit was fairly rendered, as no one insisted on truth more than he did. The essential beauty of photography was its absolute truthfulness. It was to be remarked, moreover, that those who said so much about art did not produce pictures pleasing either to artists or the public. It surprized him to hear the story of the German soldier at Ramsgate made matter for derision. To him it was an illustration of grand heroism. The fine picture of Poynter, entitled "Faithful unto Death," representing the soldier remaining at his post as the fires of Herculaneum gradually surrounded him, was a fine illustration of noble heroism expressed by good art.

Mr. **Werge** exhibited tracings of two pictures, by good painters, one illustrating the position of the horizon chosen in a landscape, about one-third from the bottom, and another the position of the horizon in a portrait background, in which it was about two-thirds from the bottom, and cutting the head of the figure. Both were true and both effective in an artistic sense.

Mr. **Wall** objected that the latter example was false in perspective.

Mr. **Howard** (Honorary Secretary) regretted to say that he was one of those who did not agree with Mr. Wall at all, and he was sorry to notice the spirit which pervaded the whole of his paper. It was, in this respect, different to any other paper he had heard in that Society, or hoped he ever would hear. The antagonism expressed to what had appeared or occurred in other places, having no connection with that Society or its discussions, was most reprehensible. It was a decidedly improper occasion to call attention to what had appeared in the journals, in which there was no reference to this Society, and attempt to make it a matter of unpleasant discussion in the Society. Further, he was afraid Mr. Wall had quite lost sight of the subject with which he started. He said he was going to treat matters of fact *versus* truth in art. Their real relation was distinct and palpably evident to every one who had ever taken a picture. Photography was as true to nature, within its own range, as anything possibly could be. The human hand never could produce anything with equal truth of detail. Whether the photographer produced beauty or not, he must depict truth, and he condemned a mode of dealing with the subject which seemed intended to mystify. He objected to surrounding a simple subject with stories having little connection with it, or lengthy Gradgrind quotations. When gentlemen came for an evening's discussion on matters relative to their art, it was certainly not desirable to waste their time with the irrelevant matters, commonplace stories, and inapplicable comparisons which had been introduced into that paper.

The **Chairman** said he was much disappointed with the paper. He had hoped to hear something really relating to facts in their relation to art truth; but he had heard no statements of facts at all bearing on art in it. With regard to backgrounds, he thought that having the horizon line cutting the face was scarcely desirable. In the works of many of the best masters it would be found that the background was frequently about the middle of the figure. Regarding the question of fact, it appeared to him that there could be no truth in art without fact, and that all artistic feeling, as well as artistic truth, must have a basis in fact. All facts in nature were associated with some ideal thought, which was often the highest kind of poetry.

Mr. **Leake** said, so many were against Mr. Wall that he, for one, although a little one, felt it his duty to say he agreed with him. He thought that in looking closely for facts we often missed something which was better. Excess of detail was often mischievous if it did not contribute to the effect aimed at by the whole, and photographers often strove too much after detail in such cases. He read some quotations from Sir Joshua Reynolds on this subject.

Mr. **Werge** said, in reference to the remarks of the Chairman, that he himself did not advocate the horizon line as high as the head in all cases. His great aim was to insist that there should not be two conditions of perspective—one for the figure and another for the background. Nevertheless, in many fine paintings the background was as high as the head. In one of Hook's, in the last Academy Exhibition, which excited universal admiration, the sea-line cut the head of the chief female figure, and thus directed attention to it, without any sacrifice of artistic feeling. In reference to the discussion at the last meeting, he wished to ask Mr. Wall definitely how he would get a bird's-eye view of a man with the camera pointed not higher than his face?

Mr. **Wall** made some brief observations, but omitted to reply to the question asked by Mr. Werge.

After some votes of thanks, it was announced that Mr. Davis would read a paper on some experiments with Mr. Ackland's process, and the proceedings terminated.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, March 13th, 1866.

The Universal Exhibition of 1867 has been for some months past for photographers, as well as for everybody belonging to the artistic, industrial, and commercial world of Paris, the object of extreme pre-occupation. The gigantic works in progress in the Champ de Mars—the preparatory arrangements being made with unequalled activity by the Imperial Commission—the news announced every day by the journals—everything already justifies the assertion, that this exhibition, to which all nations, through the medium of their commissioners, glory in adding some peculiar interest, will be a fact without precedent in the history of nations. This fantastic and prodigious dream, which will soon become a reality, could only be accomplished under the exceptional conditions which exist at the present time. Every member of the intelligent and industrious classes is therefore now intensely occupied with the part he intends to take in this universal concert. A first question of general interest presents itself to the mind of photographic and other exhibitors. What will be the place our class will occupy in the palace of the Exhibition? And this other, not less important, followed: How will our productions be organized in the space allotted to us?

The excellent arrangements of the plan of this immense palace allows of a satisfactory answer being given to the first question. The ellipsoidal form of the building, which is divided into circular galleries intersected by numerous passages radiating from the central garden, allows of the space being divided in such a manner that the similar products of every nation will be united in the same gallery, divided into so many spacious saloons. French photography, for instance, will be placed on the left of the principal entrance in the gallery behind the exhibition of fine arts, which is the nearest to the centre. It is probable that English photography will be in close proximity in the same gallery.

As for the decorations and fittings, which will be at the expense of the exhibitors, the management has been confided, as desired by the Imperial Commission, to a committee of delegates, which will be associated, for this material portion of the work, to the committee of admission. The latter is composed of Count Aguado, M. Benjamen Delessert, M. Paul Verier, M. Robert (of Sèvres), and M. Dubosc. As to the delegates named by the photographers themselves, they are :—the Marquis de Berenger, M. Frank de Villechole, M. Marion, M. Numa Blanc, M. Secretan, M. Hermagis, and M. Ernest Lacan. This committee, which represents the great majority of the exhibitors, and has been accepted as such by the Imperial Commission, has already commenced its labours. The number of French photographic exhibitors is 183 ; but several more admissions will probably modify this figure.

Another question has also deeply engaged the attention of photographers. There was a general expectation that the Imperial Commission, for reasons easy to imagine, would concede to a single photographer the exclusive right to take interior views of the whole or portions of the palace and park, of the articles exhibited, &c., &c. Many applications had been made by persons wishing to obtain this important monopoly, and the decision was awaited with no little impatience. The Commission has accepted the proposals made by M. Pierre Petit, and the monopoly will consequently be granted to him.

On account of this necessary but exclusive measure, it appeared to me indispensable to submit to the Imperial Commission a proposal which seemed to me calculated to safeguard the interests of all. There still remained for photographers a vast field of exertion within the enclosure of the Exhibition. I asked the Commission for authorization to construct in the park itself an " International Studio of Photography," composed of a certain number of spacious pavilions, forming an ornamental *ensemble*, and in which the principal photographic portraitists or specialists (stereoscopists, printers, &c.) of the different countries might be installed to operate or sell during the whole time the Exhibition should remain open. They will thus profit by the exceptional advantages presented by this immense competition in which the whole world will take part. They will have for customers a multitude of visitors of all nations, and will be favoured with a publicity hitherto without example. This International Studio will constitute an active and working exhibition of photography, and, as such, it will be regarded as most interesting by the public.

The Imperial Commission at once saw the utility of this measure, which is, moreover, perfectly in accord with its eminently liberal intentions, and accepted my offer, by granting me, in a most favourable situation, the extent of ground necessary for the buildings.

In communicating to you this intelligence, I will add, that one-half of the pavilion is reserved for foreign photographs, and that, consequently, English operators may, if they please, avail themselves of the advantages of the initiative I have taken, the importance of which they cannot fail to perceive. Ernest Lacan.

PAINTED BACKGROUNDS.

Sir,—Assuming that it is sometimes desirable to make use of a scenic background, it must be borne in mind that as the point of sight and horizontal line are *immovably fixed* in the *painting*, they must of necessity govern the whole of the photographic picture; for unless the lens be invariably directed to the point of sight in the painted background, the sitter and accessories cannot be in the same perspective as the scene.

It would be well if background makers would mark off the points of sight in their full backgrounds, and append a memorandum to their slips (at the back, for instance), stating the distance of the horizon from the base, and the distance of the point of sight from a given line. The photographer can then mark off the latter point on his plain background, and thus ensure the slip being in its place, for there is a place for it, and one only.

A convenient way to mark the point of sight is to push a pin with a bit of paper under its head into the background ; this can be readily removed whenever necessary, and will leave no noticeable mark upon the canvas.—I am, sir, yours respectfully, R. A.

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Photographic Notes and Queries.

The Polarization Theory of Photographic Action.

Sir,—The explanation by Mr. Nelson K. Cherrill of the nature of the chemical actions involved in the production of the photographic image is, in my opinion, substantially correct. The effect produced by the action of the actinic solar rays present in the film is to decompose the cohesive force into its elementary fluids, and consequently polarize the molecules of matter where this decomposition is active.

By accepting this theorem, the cause of the precipitation of metallic silver is readily explained ; the cohesive force, in its efforts to prevent decomposition and expulsion by its antagonist, attracts these metallic molecules, and endeavours by their aid to effect its recomposition, and drive off its antagonist, the action being analogous to the attractive power of the magnet.

Magnetic attraction is caused by the decomposition in the body of the magnet of the terrestrial force of cohesive attraction by the solar force of repulsive separation, and the consequent expulsion of the decomposed force from either end of the magnet in all directions. The cohesive force, thus divided and driven off, in the endeavour to expel its antagonist and effect its own reconstruction, attracts metallic particles of an analogous character to that in which this decomposition is effected.—I am, sir, respectfully yours,

Yarmouth, *March* 13, 1866. Thomas Ayers.

Blue Skies, Green Dresses, Carbon Printing.

Sir,— Surely Mr. Thomas Ayers is not a practical photographer! In his letter on " Equal Diffusion of Natural Light," published February 16, it is asserted that " the experienced photographer knows full well that the diffused light of the northern sky, which illuminates his studio, *is never so powerful* as when it reaches him through a clear atmosphere. He wants no reflecting surfaces to obstruct the light of the open sky," &c. If such is the fact, what mean the complaints about " blue days," with their chalky or solarized lights, and heavy shades ?

Truly, " experienced photographers," with good chemicals, do get good pictures on " blue days," but are not their exposures longer than when white clouds *reflect* the light ? I have been compelled to send lively infants away, when a midsummer sun has been blazing with its full power, whose portraits I could easily have taken on a more cloudy day ; and I do not think I am singular in that respect.

The many reflectors used by various photographers bear their testimony against Mr. Ayers' assertion ; and if that is incorrect, can his theory stand ?

Can you explain a matter that has often puzzled me ? When in my dark room I have often looked through a yellow window at *green* articles of dress, and I think, without exception, they have all appeared *yellow* or *brown* according to their tint ; white leaves as invariably appeared *green*.

You wonder why photographers do not adopt carbon printing. If they all had to albumenize their own paper they might be more inclined to try carbon.

If any one would prepare the tissue for sale it would be a step in advance, as most prefer to *print* for themselves.

Yours truly, Edward Seeley.

[We have not noticed the phenomenon as to the effect of greens viewed through yellow glass, and cannot explain it. Regarding carbon printing, we hope before long Mr. Swan will be prepared to supply the non-sensitive tissue. We may remark, however, that even now many photographers do prepare their own albumenized paper, and time was when it was the common practice. Mr. Seeley is just one of those photographers who would not, we fancy, consider trouble where a perfect result was to be obtained.—Ed.]

Talk in the Studio.

Photography in a County Court.—We have received a letter signed "Charles Knight, Killigrew Street, Falmouth," complaining that we had made the writer "figure as the plaintiff in a contemptible photographic case, demanding 4s. 6d. from a young lady for some execrable portraits." He proceeds: "Now I beg to say I am not a 'photographic artist at all, and that I never had the honour (?) of appearing in a county court in *any* capacity, much less in such a one; and what makes the case look mysterious, if not suspicious, is, that there is no person but myself of the name of Charles Knight residing or doing business in Killigrew Street, and, so far as I am aware, there is no photographer of that name either in Falmouth or elsewhere." We at once enquired of our correspondents at Falmouth, and two—both of whom we can trust well—furnish us with further details, and also with reports of the case, cut from the local papers—the *Falmouth Packet* and the *Western Daily Mercury*. The spelling of the name, however, appears to vary. In one case it is "Charles Kneight, of Killigrew Street," in another "Charles Knecht, of Killigrew Street," and in another "Charles Knight, Killigrew Street." If the gentleman writing to us be another Charles Knight, we are sorry that he should have been caused any annoyance; but it is clear that a person possessing this name under some of its forms of spelling was a plaintiff in the case as stated.

Photography in Art Exhibitions.—We are glad to observe that in minor art and industrial exhibitions photography is now frequently classed in its proper position amongst the fine arts. In a prospectus before us of the "Yorkshire Fine Art and Industrial Exhibition, 1866," we find photographs in the same section of the fine art division as engravings and lithographs. This exhibition will open on the first of July. Applications for space should be made before the end of the present month, addressed to the General Secretaries of the Fine Art and Industrial Exhibition, York. Prizes will be given to meritorious contributions.

Idylls of the King.—Mr. Hayman, of Launceston, a photographer of mark, has lately added to his admirably executed and interesting views in Devon and Cornwall, a series of illustrations of King Arthur's Castle, and those points in and around Tintagel rendered so popularly famous by the Laureate's verse.

Methylated Spirit.—We are requested by Mr. Jonathan Fallowfield, of Lower Marsh, Lambeth, to state that he has held a licence for the sale of methylated spirit ever since the Act was in force.

Awards at the Dublin Exhibition.—We are requested by our friend, Sir Joscelyn Coghill, to ask for the addresses of two exhibitors to whom awards were made, but whose correct address is not on record:—"160. Bourne: A medal—For excellence of manipulation and choice of Indian subjects." This is, we presume, Mr. Samuel Bourne, late of Nottingham, now of India. If any of our readers can furnish us with his correct present address, and also that of the following gentleman, we shall be glad:—"161. Smith, J. S.: Honourable Mention—For good productions from paper negatives."

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To Correspondents.

B. Jones.—Wood naphtha is not a solvent of india-rubber. We have not tried Eschwegge's purified wood naphtha, but we have no reason to believe that its solvent properties are altered by the process of purification. Chloroform (methylated will serve) is a good solvent for India-rubber, and is less offensive in smell than turpentine, benzole, or bisulphide of carbon. There are some samples of benzole, or hydro-carbon of the same class, which have very little smell, and that not unpleasant. If we remember aright, one named Sherwoodole, manufactured by Messrs. Price and Co., answers, and is not unpleasant in smell. Eschwegge's purified naphtha is prohibited, we believe, by the Inland Revenue authorities.

Iodide.—We could have judged much better if you had sent us a print from one of the defective negatives. It is probable, from your description, that the collodion is in fault; try another sample.

A Mayfield Subscriber.—Of the lenses you name, your Ross's triple will answer best for enlarging. 2. Much will depend on the quality of the negative; but if the definition in the negative be perfect, an amplification of six or eight diameters may be secured without much loss. 3. To state accurately the distances between lens, object, &c., we should know the equivalent focus of the lens; but assuming it to be about 10 inches (since the back focus is 8 inches), the distances, for the amount of enlargement proposed, would be about 30 inches from the stop of the lens to the sensitive plate, and 15 inches from the lens to the negative. 4. Theoretically, it is better to turn the lens round in enlarging; practically, we have not found that it makes much difference. You will find a good design and hints for constructing such a camera in our Year-Book for 1865. It is somewhat difficult to decide which is the best instantaneous shutter. The simple flap shutter is very efficient for most purposes. The guillotine shutter of Mr. England is very perfect, but requires fitting expressly to the camera. The back focus, or distance between the back lens of a combination of lenses and the ground glass, is not a certain guide in any calculation, and may vary in different lenses of the same equivalent focus. The point of measurement for the latter would have to be carefully calculated in each construction of lens; but approximately, in many double and triple combinations, it may be regarded as being at the point where the Waterhouse diaphragm is placed. We quite agree in your estimate of the matter to which you refer, and intend to pursue the course you suggest.

G. W. R.—There is no work devoted to the subject of enlarging with the lime light. In using an artificial light for enlarging, proceed in your arrangements as for working the magic lantern, using the most actinic light and the most sensitive process you can obtain. You will find hints on the subject, which will be of value, in our Year-Book for 1865.

J. Stotheat.—We coincide with the views expressed in your letter. Photography, like every art or science, possesses, in its commercial as well as in its other phases, some extraordinary aspects, at times amusing and at times contemptible. Such matters do not usually come under our attention; but if they did we should scarcely interfere with them. Some of the finest cards we have seen for a long time were produced by a self-taught artist, who alternated his attention between the operating room and the counter of a small shop.

J. H. C.—We have not at present any information on either subject, beyond that given in the paragraphs extracted from our American contemporary. We shall possibly return to the matter if we learn more.

A. P. A.—Your description of your position is not so clear as it would have been if you had given us a rough ground-plan. If we understand you rightly, however, your best plan will be to close the south side, and have a side light on the north side, of not less than 10 feet long, and roof light of the same extent. Under the circumstances, your background will be best placed at the east end.

S. B.—The bronzed line in print No. 1 may arise from an imperfection in albumenizing the paper, or it may arise from a stoppage or hesitation at that point in floating the paper on the silver bath. The yellow stain in No. 2 is probably due to imperfect fixation, the print having been imperfectly immersed in the hyposulphite.

J. G. H.—There is no need for apology. We only regret the delay on your own account.

Soda.—We have often stated that the toning bath of chloride of gold and carbonate of soda is the most troublesome of any, requiring much care and judgment for its use. The reason for the varied results you have obtained probably arises from the varying proportion of free acid in the chloride of gold. If you use the carbonate of soda at all, two or three grains will always be sufficient, and, as a rule, it should be used within an hour. Adding as much as twenty grains of the soda salt will frequently render the bath inactive almost immediately, and if used at once, before this change has taken place, it will often be too active, and bleach excessively. If you continue to use carbonate of soda, do not add more than is just sufficient to neutralize the gold solution. It is probable that an acetate bath would, as a rule, suit you best. The tone of the old gentleman is very good. "Common washing soda" is carbonate of soda.

An Amateur.—In commercial silver printing we fear there will always be a percentage of prints which will change colour in a short time; and that the best will not be absolutely permanent. The only process which promises absolute permanency is the carbon process. At present the most practical process is that of ordinary silver printing, toning with gold, fixing in fresh hypo, and washing rapidly and thoroughly.

J. Taylor.—The letter was forwarded.

J. G. Ediniensis.—We do not remember the exact details of formula, but, so far as we remember, we employed from half a grain to a grain per ounce, using chloride of calcium. It is probable that chloride of strontium or magnesium or any other chloride soluble in alcohol. The exposure was a second or two longer, but the positives were decidedly more brilliant. We at that time developed with protonitrate of iron.

An Old Sub.—Thanks. We will consider the matter, and act as seems best.

T. A.—We will mention your remarks to Mr. Cherrill.

Ag.—The statement is curious and improbable; but will be worth testing. We shall return to the subject. Thanks.

F. F.—From what we learn, your conjecture is probable. See paragraph in another column.

Domenico Del Re (Genoa).—The object glass of a good microscope answers best, and for ordinary purposes about an inch power is used. A good photographic locket portrait lens of 1½-inch focus answers well. We do not know much of the instruments of the French maker you name. The Almanac has been sent by post. The amount will be 1s. 8d.

R. A. B.—The spots, &c., in the prints appear to be due, as you suppose, to floating scum. The inequalities in colour are probably due to imperfection in the albumenized paper. They might arise from floating on a very small quantity of solution. 2. The greater proportion of chloride of silver present in proportion to albuminate, the bluer the print will be on leaving the printing frame. 3. Use much less citric acid.

Glass House.—You had better write to Mr. Rejlander and obtain from him a complete statement of the facts, not a partial one. The alterations referred to were made before the studio was quite completed, before the glass was put in; and he complained to us bitterly at the time of the trouble and expense of the matter.

J. B. L.—Coarse, certainly; and, as we are informed, libellous; but the subject is inadmissible for comment in our pages. It may interest you, as far as the London publisher is concerned, to know that we learn from a mutual friend, he suppressed the number as soon as he saw it, expressing regret and disgust. Thanks. Yours was not the only one, by many, bearing the Romford post mark.

F. B., W. E., L., and others.—Thanks; but the subject is inadmissible.

J. R. Johnson in our next.

Registrations in our next.

THE PHOTOGRAPHIC NEWS.

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A PHOTOGRAPHERS' RELIEF FUND.

Between two and three years ago we called the attention of photographers to the importance of establishing some organization for the relief of the sick or unfortunate amongst their number. At the time we received a few letters expressing hearty approval; but nothing was done. A few months later the subject was again brought under attention by a paper read at the South London Photographic Society, and an approving correspondence in our columns followed; but no practical steps were taken. The importance, or rather the necessity, of such an organization is generally admitted, and the easy possibility of securing it, if photographers were once really in earnest in the matter, cannot be doubted. Appeals have been made from time to time for individual cases of distress; and such appeals have always met with a response more or less liberal. The existence of a relief fund or provident society would remove the necessity for such appeals; but would at the same time prove an organized channel for the exercise of the charity which such appeals evoke, and probably bring under its aid some of those whose need is sorest, but who shrink from or fail in securing publicity for their want and woe.

The imperative necessity for some such organization as that to which we have referred has been again strongly impressed upon us by reading a case under the heading of "London Pauperism," recorded in the *Standard* of the 12th instant, in which the sad condition of a professional photographer, prostrated with sickness, is described. We shall make some condensed extracts from the statement :—

> The following case was taken from the Relief-Book of the Holborn Union, and was brought before the Board of Guardians for the first time on Wednesday, February 7. The particulars supplied by the relieving officer, for the information of the Board, were as follows :—"——Howard, aged 44; his wife, 29; five children, aged respectively 9, 6, 3, and 2 years, and 5 weeks; occupation, photographer; no relatives to depend upon, and no other earnings than those of the man himself; cause of application, the man's illness; the relief already given was one shilling and a loaf; 1 ounce of wine, a pint of beef-tea daily, and 4 ounces of arrowroot to last a week, had been ordered by the surgeon, and supplied by the relieving officer." The relief already given was continued, and the man was ordered 2s. per week and two loaves. Now, to inquire into the details of this case. The man, his wife, and five children occupy a small room on the first floor front, in a house in Red Lion Passage, at a rent of 3s. 6d. per week. There is scarcely a trace of fire in the grate, and the only food consists of half a loaf, which the children are looking at with hungry eyes. In the corner, separated by an imperfect curtain, hung by a string from wall to wall, lies upon a truckle-bed a pale but intelligent man; he is unable to move hand or foot from acute rheumatism, which has confined him to bed for ten days. The bed is rough, and the coverings are so scanty that it is necessary to increase their warmth by the addition of ordinary clothing, which gives a dirty and singularly miserable aspect to the unfortunate man, whose sufferings, moreover, are greatly aggravated by the want of every necessary, and by the constant crying of his noisy and starving children. His history is a sad one. His father was a barrister, and for three consecutive years mayor of one of our largest maritime towns. He himself was apprenticed to a surgeon, and became a student of University College and a pupil of Mr. Liston. Unable, through family misfortunes, to complete his course of study, and being gifted with a variety of accomplishments, he became a photographer, and until the present summer succeeded in obtaining a comfortable living, his resources being increased in winter by writing for the law booksellers, and by painting the slides of magic lanterns, as well as other artistic work of an inferior kind. During the past summer misfortune came upon him, and employment was less regular and remunerative, so that he had been compelled to part with many little luxuries he had formerly possessed. And now his difficulties came thick upon him; his wife, after her confinement, five weeks before our first visit, was seized with inflammation of the bowels, and was unable to rise for three weeks. No sooner had his wife recovered than four of the children were seized with measles, and one of them was so ill as to need constant care. Unable any longer to pay for help, he felt obliged to call in the parish surgeon to attend the little one. Exhausted with anxiety, care, and want, he now ventures abroad in the changeable and wet weather, with scanty clothing and bad boots. He takes cold, and returns, shivering and ill, with the symptoms of rheumatic fever, and is laid up in bed in the condition we have already described. During all this struggle there is no thought of applying for parish relief; even now he hopes soon to be well, and has confidence in the future. He points with pride to a letter which contains the offer of work, and believes if only he could be cured he would be able to support his wife and children by his wits or labour. It is only after being more than a week in bed, and when every resource is exhausted, that his wife makes an application to the guardians, who treat the case as we have pointed out.
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> A month has elapsed since the date of our first visit, and again we enter the same room, and find the man still confined to bed with painful limbs, but with a countenance more pale, more thin, and more suffering than before. For one day alone his energy seemed to revive, and his pain left him, so that he sat up; but the effort was beyond his strength, and a relapse ensued. The allowance from the parish still remains the same.
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> It speaks volumes for the honesty and character of this unfortunate family, that throughout the terrible sufferings they have undergone they have regularly paid their rent until the last fortnight. The woman since our visit had grown sensibly thinner, and she said that she had been driven to write letters to friends and benevolent persons to ask their aid; that she had never done anything of the kind before, and that she was entirely ignorant of the places where assistance could be best obtained. One lady had given her 5s. and some soup for her children, and their neighbours had been extremely kind. The sums thus obtained had been given to the landlord, that they might retain the home and furniture they had so long possessed. At our first visit a removal to the hospital, however desirable, could scarcely have been possible without serious risk, the man was so ill and the weather so bad; but now, when it was proposed, it would be thankfully accepted but for the fact that the home must be broken up, the furniture be taken for rent, and the wife and children be housed in the workhouse and made familiar with pauper life.

In reference to this especial case we may remark, that the guardians, having had their attention aroused, after denouncing the *Standard* article as inaccurate, as it is the wont of Boards in such cases, have increased the amount of relief. In addition to this the *Standard* has announced the receipt of various sums contributed for the immediate relief of the family, so that we hope the pressing need has been removed, and that the poor fellow may receive such medical aid and comfort as will restore him to health and employment; and in the meantime, if any of our readers are willing and able to further contribute to that end, the Editor of our daily contemporary will undertake the charge of donations.

But taking this case as a type of many which might exist, possibly of some which do exist, the importance of a Relief Fund becomes the more urgently impressed upon our attention. As the applications of photography extend, the number of persons depending upon it for subsistence increases, whilst in many cases, probably, the ratio of remuneration decreases. Every year the existing operatives are tending nearer to old age. It rarely happens in any trade that the remuneration of labour affords much facility for providing against sickness, accident, or old age, and the indigency which follows hard upon any of these. Photographers certainly have no special immunity from the ills of life, their occupation in many instances, from various sources, exercising a severe strain upon the constitution. Almost all other trades and professions have some organization for providing against the dark chances of life. Literature, Art, the Drama, Music, have each one or more associations for the aid of their needy adherents. The established trades have in almost all instances provident societies, and in one instance, at least, a younger and probably much less extensive body than photographers—we mean the telegraphic clerks—has already organized a society for such a purpose as that the importance of which we urge.

Such a project has everything to recommend it, and nothing to detract from its value. It would afford employers and wealthy amateurs a method of aiding by their contributions the employed and less fortunate, without the disadvantages of desultory charity on the one hand, or loss of self-respect on the other. Suppose, for instance, that the scheme we have before recommended be adopted, and an association be formed, the members of which, contributing according to an ascertained scale, would have a right to aid in sickness and age; and that, in addition to this, contributions were obtained from those connected with the art, but whom Providence had placed beyond the chance of needing its aid; there are hundreds of photographers, we believe, who would gladly contribute a guinea a year to such a fund who would never require to receive a penny from it, whilst there are hundreds more who, contributing their subscription in health and strength, might accept the aid in their necessity without feeling pauperised or debased.

Will no one take this matter up? An energetic person with a little leisure, a kind heart, and a shrewd head, is needed. We believe that an initiation is all that is necessary, and that, once started, such a purpose must succeed. It is common ground, upon which all honest men in the art might meet: it is not the cause of party or person or clique or class, but of photographers. We do not now even indicate the outline of a working scheme; but we shall be glad to enter into detail and help whenever we are called upon.

ON BACKGROUNDS IN PHOTOGRAPHIC PORTRAITS.*

We have now to consider the question, What is truth in a background? The question will necessarily apply chiefly to pictorial backgrounds. Possibly the matter may be made more clear by answering the questions which arise negatively. A background containing an amount of subject or a number of perfectly defined objects such as could not possibly have been produced by the lens if pointed at a similar scene in nature, is not true. A background containing objects relatively incorrect in proportions is not true. A background with perspective altogether different to that of the foreground objects or figures is not true. A background with objects lighted from a different direction to that which illuminates the sitters, &c., is not true. An incongruous background, involving impossible relations between the sitter and the scene in which he is placed, is not true.

One of the most flagrant falsities in common pictorial backgrounds is the amount of subject and variety of objects introduced; the number and small proportions of the objects indicating their great distance, whilst the sharpness and solidity with which they are painted indicate their position as immediately behind the sitter. The lines are crisp and well defined, the tones and contrasts are firm; there is nothing of atmospheric effect in giving a hazy indecision to objects which, from their relative size, must be at least a quarter of a mile distant.

It is not necessary to introduce any definitely made out or prominent objects in a pictorial background at all; but if any be introduced, they should be in true proportion and true relation to the rest of the picture. Some of Mr. Robinson's charming card pictures are admirably managed in this respect. One of the backgrounds consists of the entrance to a rustic arbour filling the whole space of the background; and as he was careful to light his figures as his background was lighted, a very pleasing effect of naturalness was produced. In this case, however, he painted the background himself, to suit the lighting of the room in which it was used. Another of his cards, which lies before us, is suggestive of the background of Millais' "Proscribed Royalist." The trunk of a huge tree occupies a large space in the background, the remainder consisting of the entrance to a glade in the forest; the whole painted quietly and with great breadth. M. Silvy has some excellent pictorial backgrounds, consisting of close scenes, which are very effective. In Mr. Falconer's charming cards, the pictorial backgrounds, which are amongst the most effective we know, there is scarcely anything definitely made out; he avoids the trees which look like cabbages, and architectural columns little bigger than walking sticks, altogether. An undulating country, in which neither linear nor atmospheric perspective is disregarded or violated, underneath a low-toned sky, form together a background remarkably effective in giving force and relief to the figure. In aiming at truth it is not necessary that anything should be introduced into the background which will destroy the effect of the portrait. The background is subservient to the portrait, and all its parts should be considered with a view to giving value to the portrait, but in this it is not necessary to sacrifice truth. The painter, mentioned by Burnett, who had painted his landscape background with such force as to induce the exclamation, "This is the picture of a tree, not of a young lady!" was recommended by a good artist to paint up the head with sufficient force to keep the tree in its place. The converse of this would be necessary with the photographer, as he does not possess the facilities of the painter for increasing the relative force of his figure; he must of necessity, therefore, to do justice to his sitters, use a background sufficiently subdued in tone and quiet in composition to throw up the figure as well as harmonize with it. But in doing this there is no necessity to sacrifice truth, as a well-selected natural scene truly represented may as easily effect this end, in judicious hands, as the most falsely conventional background which ever outraged nature and propriety.

The perspective question is one which needs little remark, as the common errors once clearly pointed out, as they were by Mr. Werge, the question does not admit of much argument. It is perfectly clear that if natural objects are represented at all in the background, they should be represented under the same conditions as the main figure in the picture, and that there should not be one point of sight in the landscape and another for the figure. The horizon must be opposite the lens, if it be rendered at all.* It is in no wise necessary to the dignity of the figure that the horizon line should be low; witness almost all Raphael's paintings, especially the cartoons. Here before us is one of his Madonnas, with the horizon level with her neck; but the figure loses nothing in grace, beauty, or height. Here is Richter's "Christ Walking on the Sea," with the horizon cutting the shoulders of the principal figure; but it loses nothing of nobility or dignity by the true rendering of the background. We might point to scores more, but it is not necessary to enforce further a proposition so readily demonstrable. To secure not only immunity from palpable blunders such as we have just referred to, but also to secure the nearest approximation to absolute truth in perspective in the background, will, however, demand much thought and care; and to secure something like truth, the scene should be painted with distinct intention to be used in certain conditions and with a lens of certain focus. Suppose the figure be eighteen feet from the lens, and the background consist of a scene the nearest object in which is supposed to be about three feet, or any other distance, from the sitter, the perspective should be painted so as to render these relations correctly. Failing this regard for truth, the scene chosen should be such as will least loudly pronounce its falsehood. In a large number of the worst kind of pictorial backgrounds we have subjects chosen which show the least inaccuracy in this respect at once, such as tesselated pavements, staircases, &c. Besides being often incongruous and spotty, such objects always offend the eye by obtruding the disregard for perspective truth, and should be especially avoided. A landscape truthfully drawn, but without much definition, and without anything which especially directs attention to the linear perspective of the picture, may always be effective, and may, if not absolutely true, be at least not palpably and obtrusively false. Some of those of M. Silvy, Mr. Robinson, Mr. Falkner, and M. Joubert have admirably illustrated what we mean.*

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* Continued from p. 111.

* We would here call the attention of the reader to an interesting letter, signed "R. A.," in another column.

The same remarks hold good of the lighting of the background. It may be difficult to secure absolute harmony between the lighting of the sitter and the lighting of objects in the background. It is necessary to vary the light at times for different classes of sitters; some require more top light, some more side light, and some more front light; whilst the light on the background is already determined. This introduces a difficulty at the outset. But if the backgrounds be originally painted to suit the general lighting of the room, and with the light and shade not too strongly pronounced, it will be very easy to avoid glaring error. It would of course be absolutely intolerable to light the sitter from the right side whilst the background was lighted from the left. The most illogical defender of conventionalism would scarcely do that.

The untruth of incongruity, although often practised, will scarcely find defenders. Carpeted rooms, only divided by a balustrade from a rocky shore or a bleak heath; ladies in evening dress seated amid gloomy mountains beneath stormy skies, &c., &c.;—these are of course the follies of thoughtlessness, and not of purpose, and only need at present a passing condemnation.

It may be urged, by some, that the conditions of truth in pictorial backgrounds are so difficult that they will scarcely ever be secured. That may be good argument for abandoning the use of pictorial backgrounds, but not for deliberately employing palpable untruth. In truth, unless judiciously used, we are no lovers of pictorial backgrounds. The skilled artist has many resources in the use of legitimate accessories—drapery, &c.—for harmonizing his picture. The constant repetition of the same pictorial background becomes much more wearisome than the constant use of the same plain background. But if pictorial backgrounds be used at all, let them be simply and broadly treated: include few objects, but, so far as they go, let them be without untruth. There are some forms of the painter's conventional background which, whilst admirably serving their purpose, do not violate truth. Here is one before us, well known as "Titian's Daughter;" a piece of architecture, probably a wall, in shadow, partially covered by a piece of drapery, fills rather more than a third of the picture, the remainder consisting of landscape simply and broadly painted. There is no especial function that we can make out in the wall or drapery; but they outrage no truth, and excite, therefore, no especial attention.

It has been pleaded, in defence of adopting the disregard of truth called conventienalism, in backgrounds, that photography is not necessarily true in fact, and often not true in art; that the misuse of lenses will give false perspective and distortion; that under-exposure will give crudity where in nature there is harmony; that by bad lighting it will give flatness where there should be relief; and that it can at times absolutely alter contours by the ill-arrangement of light and shadow,—all this is true; but it is the steady aim of the true votary of the science to remove these reproaches. Opticians, chemists, and artists have been striving, and with considerable success, to remove these evils, and make photography render truth in fact and truth in art. The progress has already been great, although much remains to be done. But because we cannot at all times secure perfect truth, shall we voluntarily surrender one tittle of the truth which we can command? Whatever may be its shortcomings, its truth is still the proudest boast of photography. Where absolute truth cannot be attained, we will accept the nearest approach to truth which we can secure, fully assured that the highest achievement of the highest art is never attained by the slightest sacrifice of known truth.

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WATCH DIAL PORTRAITS.

BY J. CARBUTT.

Among the many valuable formulas and processes given to the world as an aid or improvement in photography, none holds so high rank in our estimation as Frederick Scott Archer's collodion process; and next to it we place the formula for collodio-chloride, given to the public by Mr. Wharton Simpson, the Editor of this journal; for by the aid of both we are enabled to produce, in a short space of time, one of the most beautiful positive pictures capable of being made at the present day. And the conscious pleasure the Editor must feel at having done the fraternity so much good is in striking contrast with what difference it would have been heralded to the world had some "Cutting"* person discovered the formula; perhaps such a one will make himself known in a year or two's time; instance the bromide patent, now giving so much trouble to the photographers of the United States.

It is well known the Americans are fond of novelty, and the printing of a flattering miniature face on to the dials of their watches is one of the novelties that suits the present fancies. I do not claim the originality of photographing on a watch-dial, but not having seen any method described, I send mine for the benefit of the readers of the Photographic News, as by it I have put from one to three heads on one dial from as many different negatives. After taking off the dial, or having it removed by a watchmaker, take a square piece of cardboard half an inch larger each way than the dial, place the dial centrally on it, and press very lightly, just sufficient to make an impression of the pins that hold the dial to the watch; then, with a large pin or other metal point, pierce through the card at the spots marked by the pins, and place the dial on the card, gently pressing the pins of the dial through the holes.

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* In the absence of objects which readily give the perspective lines it is difficult for any but a highly cultivated eye to detect slight error. This may be illustrated conversely by the fact that, in a recent article, a writer on the subject, in examining a certain picture, pretends to discover three distinct points of sight, and therefore three different positions of the camera, in a group of four figures, which were really photographed altogether, at one exposure, on one plate, with one lens, without movement of any kind. No comment of ours is needed to point the extreme blunder in this case, and untrustworthiness of such observations. It is true that such *dicta*, uttered with "bombast circumstance horribly stuffed with epithets of" art, are a little intolerable, but they are nevertheless really useful as significantly indicating the worthlessness of such teachings.

* Cutting was the name of the American bromide patent

Now, supposing you wish to put on one portrait, and should there be no lettering under the xii., it will be best to place it there; but should there be lettering there, it would have to be placed in the space to one side of the centre; place a straightedge of card on the dial, so as to bisect the xii. and vi.; make a line with a pencil from the edge of the dial to the edge of the card. Now place the straight-edge across the dial, so as to cut about nine minutes on either side of the twelve, and mark to the edge of the card; take up the dial and card, make a short mark on the back to correspond with those on the front (these are to be the guides to aid you in placing the dial in the proper place on the negative); now remove the dial from the card, wipe the face with chamois leather to cleanse it from dust, &c., flow over it a mixture of equal parts of albumen and water, coax off any surplus that hangs to the edge with blotting-paper: when dry, replace on the cardboard, flow with collodio-chloride of silver, set aside to dry in the dark; while drying, prepare the negative by drawing a line on either side of the head and in a line with the top of the head, also a line above and below the head that would bisect the figure if drawn through; make a small vignetting mask out of straw board, 1-8th inch thick, and sufficiently large in surface to shield the dial from all action of light except what passes through the vignette opening, fasten to the negative with gum paper, secure your negative in the opal or other printing frame; the dial being now ready, place it face down on the negative, observing that the lines on the back of the card exactly correspond with those on the negative. On the card and between the pins lay a piece of the strawboard, sufficiently thick to protect the pins of the dial from receiving any pressure (if not so protected the dial might be injured); place a piece of velvet over the whole, taking care not to change the position of the dial. (I use a stereoscopic plate and printing frame, taking the negative on one end of the plate.) Block up one end of the printing frame to the thickness of the dial and cardboard; let the pressure of the springs be light. By holding the frame in such a position as to *lift* the negative off from the dial, the progress of printing can be examined with very little fear of moving the impression. When printed, wash, tone, and fix as for other collodio-chloride prints, and well wash after fixing, dry, and replace on the watch. I find it best to use no varnish, as if proper care be taken in the manipulation the dial dries bright and clear.

Chicago, U. S., February, 1866.

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MODE OF PREPARING SOME ORGANIC SULPHATES OF IRON FOR DEVELOPING NEGATIVES.

BY M. MC. A. GAUDIN.

The English photographic journals continue to give directions for the preparation of salts of iron with gelatine, which are found very superior to acetic or ammoniacal sulphate of iron; but no definite salts have yet been produced. Albumen has also been successfully substituted for gelatine. Organic chemistry, however, teaches us the means of producing a multitude of acids having sulphuric acid for a base, and which form very definite and soluble salts, even after their combination with baryta. In all probability, by combining these acids with protoxide of iron, very advantageous reducing agents will result. Among this number are, for example, sulpho-vinic and sulpho-methylic acids.

We may easily obtain these two acids by causing warm sulphuric acid to react upon vinic alcohol, and upon methylic spirit or wood spirit. During the reaction, sulphuric ether and methylic ether is disengaged, and a mixture of free sulphuric acid and of sulpho-vinic and sulpho-methylic acids remains. At this moment, if we add some pulverized carbonate of baryta to each, the saturation of the acids is effected. The free sulphuric acid produces insoluble sulphate of baryta, and the organic acids some sulpho-vinate and of the sulpho-methylate of baryta which remain in solution, so that by filtration we can obtain either salt of baryta in solution, perfectly exempt from free sulphuric acid.

To obtain the sulpho-vinate and the sulpho-methylate of iron, it is only necessary to pour a solution of sulphate of iron into each filtered liquid, until the cessation of the precipitate of sulphate of baryta; then, by concentrating the liquors, we obtain crystallized salts of iron, susceptible of being weighed for use.

The precipitation of the baryta takes place, whatever be the degree of oxydation of the sulphate of iron with which we react, and in all probability the sulphate of iron, lightly acidulated previously with nitric acid, will produce a red tinted salt more eligible for use, which is also ultimately formed by the contact of the proto-salts of iron with the atmosphere.

It is not possible to anticipate of the two preparations now indicated, but there is every reason to believe that their employment will give very remarkable results.

To photographers resident in Paris it will be very easy to procure sulpho-vinate of baryta ready prepared; it is sold in the state of crystals of remarkable beauty; they can be employed, when dissolved, to prepare sulpho-vinate of iron by double re-composition. The equivalent of the barytic salt being 24, and that of the hydrated sulphate of iron about 16, it will suffice to cause 3 parts of the barytic salt to react upon 2 parts of sulphate of iron to obtain the sulpho-vinate of iron of known strength.—*La Lumière.*

◆

THE GELATINO-IRON DEVELOPER.

BY E. DUNMORE.*

Mr. Chairman and Gentlemen,—In the discussion which occurred at the January meeting of this Society, on the comparative value of the ordinary and the gelatino-iron developers, I hesitated to give any opinion on the matter, because I was not then a member of the Society. Now, however, that little difficulty has been removed, and I have the pleasure of appearing before you to state the results of my experience with this developer.

Since the introduction of gelatine for the purpose of improving the developer, I have almost daily experimented with it in all conditions of light, and many conditions of temperature excepting excessive and continuous cold weather; but I have no doubt it would fully answer my expectations even then. Having tried nearly all the published formulæ, also many modifications of my own, I am quite satisfied that no *single* formula will answer for all kinds of subjects, as some suppose. Many failures, doubtless, may be attributed to this fact alone; for example, I may succeed with one particular kind for a landscape brilliantly lighted and of a general tone of actinic colour. I praise the developer, and give it to a friend, who uses it for some copying purpose where no half-tone, so to speak, is required. The next time we meet, my friend says, he "cannot get on with the new plan, it seems to require a very long exposure, and is altogether not nearly so satisfactory as the old method." Of course not; it was simply combined for an entirely different purpose. Try it with a similar subject to the one for which I used it, and then let me have your opinion. Now the fact is, that many who say that they cannot get intensity, really do not know when they have got it, and continue to pile on the deposit with pyro and silver, or other reintensifying solutions, until they make the negative *seemingly* much more intense, when in *reality* it would print much better had it been left alone; for frequently it happens that the reintensifying process not *only* alters the thickness of the deposit, but changes a non-actinically coloured image into one much more permeable by actinic light.

"As the proof of the pudding is in the eating," so is the quality of the negative not in the negative solely, but in the prints that can be procured from it. A rock upon which many photographers strike is directing most of their attention to the production of a good-looking negative, considering the appearance of this division of the process the *sine quâ non* of clever manipulation, and feel disappointed on receiving their finished prints to find they do not come up to their expectations, although they may be as good as could be possibly obtained from the negatives in question.

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* Read at the Photographic Society, March 13th, 1866.

A universal and definite mixture for *every* purpose of development is not yet discovered, and in all probability never will be; but I consider the introduction of gelatine a power that can be modified to suit any purpose and develop any kind of picture in photographic monochrome that could be developed by a simple iron and acetic acid solution.

I have this evening brought for your inspection a few photographs from negatives produced by this process by one development, and no after intensification whatever. Nearly all were taken in different lights, from the brightest sunlight at midday till late on a gloomy afternoon, by a Ross 12 by 10 doublet. The subjects include landscape, portrait, engraving, and oil-painting copies, to the margin of which I have appended the conditions under which they were taken. Of the small portrait subjects I have brought the negatives, which were taken by *one* lens, the plates being then divided, and the halves differently developed, not for the purpose of showing any artistic merit, but merely to demonstrate the behaviour of the two different modes of treatment.

One negative has received the proper exposure under the circumstances in which it was taken for the ordinary iron developer; the other much over exposed for the same. You will observe the result; the half receiving the proper exposure, and developed by the ordinary iron process, although pushed to the utmost extent, still requires a little reintensifying, and shows signs of fog, but would make a good printing negative upon receiving the additional intensification; the other, over exposed with this treatment, is irretrievably lost; but both halves undergoing the gelatine treatment are satisfactory, and make good brilliant prints, and are in fact all that can be desired.

Notwithstanding these results, *as a portraitist* I will not discard the old fashion; for, where numbers have to be attended to, economy of time is a paramount consideration. With the gelatino-iron solution the negative is much slower in development, and, although completed in one process, must be completed before being set aside; whereas with the ordinary kind it is quickly developed, and can be set aside until convenient to finish it, without risk of deterioration. This I consider the only disadvantage attached to its use; in all other respects I prefer our new friend, and will stick to him for the present, or until superseded. A great advantage I have found is, that where a plate is kept a considerable time between sensitizing and development, there is much less tendency to stains. Some of the prints before you were more than an hour-and-a-quarter to an hour-and-a-half, the majority of them half-an-hour between the two processes, because, when working without a tent, I had frequently to carry my dark slide a considerable distance. The remarks of the natives who were watching the process, and whom I occasionally asked to look after the camera during the time I was absent to fetch the plate, were very original, not to say amusing. I remember one antique farm-labourer asking me, "I 'spose it's spurrets inside o' that 'ere box what makes them picturs?" This was put in the most grave and solemn manner, much more than the answer I gave him. What "spurrets" he intended I am at a loss to determine, but some new developing agent, I have no doubt, that, were it generally known, it might probably supersede even gelatine. I suppose, however, those standing near perfectly understood the oracle who had addressed me, by their approving gestures. To enter into an explanation with them would be making mystery more mysterious still; so, with a few words and the completion of the plate, I packed up my camera and moved on.

At the time the landscapes were taken, I had given the gelatine but a short trial, and I feel confident that, were I to go over the same ground again, I should return with much better results, having since then become thoroughly acquainted with the tricks and manners of the new combination.

To sum up its good qualities—

We save much expense in pyrogallic acid, silver, alcohol, and acetic acid.

We save much dirt by not having to intensify.

We save much time by one operation instead of two.

We save many pictures that over exposure and long keeping between sensitizing and development would spoil.

We save much anxiety by having a developer so manageable that we can develop large pictures with little more trouble than small ones; in fact, it makes the process a pleasant one, a certain one, and an easy one, and improves the health of the operator by keeping him in a good temper. He retires to rest at night pleased with his pictures, himself, and all mankind generally; especially those gentlemen through whose experiments and researches this power has been brought before the public. With all this, then, to recommend it, what photographer would be without a bottle of it upon his operating table always at hand, and ready when wanted, labelled "Gelatino-Iron Developer"?

◆

ON THE USE OF SILVERED GLASS IN THE DAGUERREOTYPE PROCESS.

BY HENRY DRAPER, M.D.,[*]

Professor Adjunct of Chemistry and Natural History in the University of New York.

While engaged in the construction of 15½-inch silvered glass mirrors for my 12½-foot reflector at Hastings, I ascertained the conditions under which silvered glass may be used for Daguerreotyping. The observations were published in the Smithsonian Contributions to Science for July, 1864. As the subject is beginning to attract attention, it seems desirable to refer to the necessary precautions somewhat more in detail.

Of the processes for silvering on glass, that known as Cimeg's, in which Rochelle salt is used as the reducing agent in a solution of ammonia and nitrate of silver, is one of the best. It furnishes hard and tenacious films, and they can be thoroughly polished with a piece of buckskin and rouge. The full details of it are given in the above-mentioned memoir. They are too copious for insertion here.

A silver film on glass iodizes and bromizes beautifully if freshly polished, acquiring the peculiarity of giving a rosy warmth to the resulting picture. It takes impressions with shorter exposures than the ordinary Daguerreotype plating, owing, probably, to the absence of the usual copper alloy. The principal precaution necessary is, in fixing, to use an alcoholic solution of cyanide of potassium, instead of hyposulphite of soda dissolved in water. The latter has a tendency to split up the silver. The subsequent washing must be with diluted alcohol.

Pictures obtained by this method will bear high magnifying powers, without showing granulation. Unfortunately, the exposure required for them is six times as great as for a sensitive wet collodion, though the iodizing and bromizing be conducted so as to produce the most impressible surface.

The amount of silver which is spread on the surface of the glass is very small, a cent's worth more than sufficing to cover 190 square inches.

In a photograph of the moon, taken early in 1864, on silvered glass, a singular result is observable. The mercury has found its way through and through the silver, and the picture is visible on both sides of the film.

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[*] Read before the American Photographical Society, January 8th, 1866

I have also converted films of silver into iodide of silver, so as to use them in the wet process, instead of collodion or albumen films. The uncertainties that arise from variations in collodion are avoided by having nothing but the silver salts on the glass. The manipulation required is, however, almost too delicate for common use, though the results are good.

◆

THE CONNECTION OF PHOTOGRAPHY WITH THE FINE ARTS.

BY E. DUNMORE.*

Photography has long been struggling to force itself into an *equal* position with painting and the fine arts generally. The difficulty of doing so has been far greater than might have been anticipated, for, even now, a strong opposition wishes to degrade it to the level of a mere mechanical operation. Will photographers allow this? Certainly not; but it is, however, only by the cultivation of *true* art that we can place ourselves in a position to assert its equality.

Hitherto the majority of photographers have had but one object in view, and that object was manipulative skill, which, as far as it goes, is a worthy object, and the results are both useful and beautiful. We have now, however, begun to perceive that something beyond mere processes is to be attempted; and the very fact of the opposition of many to allow photographs to have equal consideration with other works of art acts as an incentive to improve and develop those powers which have hitherto been restrained and hidden by the exclusive attention given to the manipulative portion of this interesting and useful science. An artist has certainly to learn the fluent use of his means, as persons learn to write; but he should not make so fatal a mistake as to consider the means as the end. During the time he is learning the language of his profession, he must bear in mind the *objects* of the language he is learning. Those by whom the manipulations of an art are considered its sole merit have raised an impassable barrier to their success—as far as the production of pictures, in the strict meaning of the word, is concerned—and at which they soon arrive. But those who, fortunately escaping an idea so fallacious, have become convinced that the production of a truly artistic picture is not merely mechanical but an effort of the mind, have opened a channel of constant improvement and unlimited progress ending only with their lives. Quintilian (lib. vi., cap. 10) says, with reference to painting, that the artist, having "once perceived the *true manner*, will easily obtain the similitude of such things as come before him." Now, this "true manner" is of infinite importance, and applies equally to the photographer as to the painter, who merely uses different means to obtain similar results. It cannot be obtained by any amount of manipulative skill, for it depends entirely upon the judgment and a right mode of seeing and thinking; and it is the discovery of this reasoning power at which we must aim, for without it all the mechanism of photography will be labour in vain, and its elevation to rank with the fine arts will be indefinitely postponed.

This kind of knowledge is obtained solely by observing nature in all its infinite variety. But there is another kind to be gained by the study of clever paintings, and observing the arrangement of materials and the disposition of the light and shade. We soon learn that some methods are better than others, and that the strictest attention has been paid to both lineal and aerial perspective. The disposition of lines is of the utmost importance to the landscape photographer if he desire to produce an artistic work, and he should always endeavour to arrange them so that they assist the aerial perspective.

With a true knowledge of art rules there must be added that certain something, denominated feeling, which must permeate the entire work, and which never fails, when properly expressed, to produce pleasurable sensations in the observer. In this no photographer can have any limitation pointed out to him. That tact, proceeding from a highly cultivated mind—which by increased sensibility more readily receives impressions—tells the artist he can only succeed on one grand principle, and that supreme success in his art will depend, as Cicero says, when speaking of oratory, on "insight into the workings of nature and all the power of humanity."

Again: we must never depend *alone* on beauty of form. Now this applies particularly to photographs, for without the assistance of chiaroscuro we could never produce an artistic picture. We must amalgamate the two, making that compound of skill, recommended by Horace, in which art is not perceptible. Many may be found who can judge of the works of others, being, at the same time, themselves but poor performers. These usually ascribe the success of the fortunate to something innate in the producer—a something that cannot be learnt, and which is generally termed genius—forgetting that valuable precept of Sir Joshua Reynolds, "that whatever is done well is done by some certain rule, otherwise it could not be repeated,"—an observation containing so much truth, so much instruction, and so strongly inculcating the necessity of method, that it ought always to be remembered.

Each individual's stock of knowledge is but trifling when compared with the accumulated stock of human learning. From this, however, we must and may borrow; and if, by our own experience, we can add another particle of information to that already amassed, society will have derived an advantage; for the improvement of any particular department is a benefit, directly or indirectly, to the rest—an axiom that has been allowed for ages. Tertullian says:—"There is no art that is not either the parent or near relation of another." Now, of all modern sciences, photography boasts of more near relations than any other. It affects nearly every known science in some way. It lightens the labour of the artisan, and finds employment and amusement for thousands in every station of life. It renders what was impossible formerly to observe with accuracy a matter of the greatest ease, ramifying and insinuating itself into the common necessaries of civilization, asserting its value in both the palace of the noble and cottage of the peasant, capable of affording the utmost satisfaction to those whose chief pleasure is the study of pictorial art, and is, without exception, an universal science that is not only worthy of *equal* consideration with the fine arts, but deserves a position with the foremost; and if photographers will carefully and conscientiously practise it, making the means always subservient to the end, bad pictures will be exceptional, and all outrages on pictorial rules of art will cease. Photography will attain that place of distinction it is destined sooner or later to occupy.

My paper has been but brief, and such a comprehensive subject deserves a much longer and better one than I can prepare. I have, however, endeavoured to show, to the best of my ability, the necessity for all to observe those rules in the practice of their art without the knowledge of which we labour in vain, and without which we shall not see that advance in photography we all so earnestly desire.

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TO ADJUST A PAIR OF COMPOUND LENSES TO ONE AND THE SAME FOCUS WITHOUT CHANGING THE CURVATURE OF THE LENSES.

BY PROF. TOWLER.*

It frequently happens that the photographer has already in his possession a pair of quarter or half tubes of nearly equal focal power, or that he could easily obtain a second tube to match the one in his possession, but not being acquainted with any means of adjusting the pair of tubes to an equivalent focus, the pair is, or would be, useless for stereoscopic purposes.

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* Read at a meeting of the North London Photographic Association, March 7, 1866.

* *Humphrey's Journal.*

The first pair of stereoscopic lenses possessed by the writer were originally a couple of half tubes by two different opticians, and were not equal in focal length; it was at a time, too, before central stops had been introduced into the portrait lens.

Here, then, were two corrections to be made—one for spherical aberration, which existed to a considerable extent in either tube, and the second for an equivalent focal distance, both of which were attained in the following manner:—

To reduce the Spherical Aberration to a Minimum without changing the Form of the Lenses.

A number of discs of black calf leather, such as is used for making heavy shoes for farmers, &c., were cut out of the size of the brass tube holding the lenses; these discs were furnished with central apertures varying in diameter from one inch and a half to a quarter of an inch. By introducing the disc with the largest opening and placing it in the brass tube between the lenses, it was found that a given landscape picture became more sharp than without the stop, and that the greatest sharpness was obtained when the leather disc was exactly in the centre between the lenses. Discs with smaller and smaller apertures were thus tried in succession, and the result was that, as the size of the aperture diminished, the sharpness of the picture increased.

There was nothing new in all this arrangement to the scientific optician, and yet, strange to say, no one as yet had introduced the central stops between the components of a portrait lens. In this way the spherical aberration of the two tubes was reduced to a minimum as far as regarded the means applied.

As the aperture of the stop, however, became diminished, the time of exposure had to be increased.

The second step to be taken consisted in adjusting the focal power to the same size.

Before we proceed to show how this is to be done, we must instruct our readers how to ascertain whether a pair of lenses have or have not the same focal length.

Focus with either lens upon the same object and from the same distance; if the picture of the object is exactly of the same size (which can be measured by a pair of fine-pointed compasses or dividers), the equivalent power of the two lenses is the same in either lens; if the size of the same object in either picture on the ground glass is different, assume either size as the standard to which the other is to be adjusted. If the tubes are half tubes, it will be advisable to assume the smallest size as the standard.

To find the Focal Length of a Lens, which is Equivalent to two Lenses separated by a given Interval,

we have the following formula:—

$$1 \div F = 1 + 2 - d \div 1 \times 2.$$

In which F represents the focal length of the single lens, 1 and 2 the respective focal lengths of the two lenses separated by the distance (d).

The reciprocal of the focal length is assumed as the representative of the magnifying power of a lens; thus $1 \div F$ is the reciprocal of F, and expresses the power of the single lens; but this power, as is evident from the above formula, increases as d diminishes, and decreases as d becomes enlarged. Proceeding with this knowledge, we see at once that, by changing the distance between the lenses—that is, by either increasing or decreasing this distance—we have the means of adjusting the focal length to a given distance.

We assumed the smallest-sized picture on the ground glass as the standard; in reference to this standard it is proposed to apply a correction to the second tube, so that the picture made by it shall be exactly equal in size to that made by the standard tube.

In order to make the picture smaller we must increase the focal power ($1 \div F$); this is effected by diminishing the distance (d) between the front and back lens; therefore, remove the lenses and cut out from the centre of the brass tube about half an inch. This is easily done by means of a new triangular file, but much better in the lathe. The two edges of the two tubes are finely polished.

An extra brass tube is now constructed, one inch and a half in length, and of a diameter so that the two pieces can slide easily but accurately. By this adjustment the distance (d) can be increased or diminished, to a certain extent, between two limits.

Screw on the two lenses again, and slide the two tubes upon the central tube until the distance between the lenses is now less than it was originally; and placing the camera again upon the position it occupied when the standard picture was taken, focus upon the same object as before, and measure the picture. It will now be less in size than it was before. If it is still not small enough, slide the two tubes nearer together, focus again, and measure. By this means of approximation you proceed until finally the picture taken by either lens is exactly of the same size. We then conclude that the two lenses have an equivalent focal length: they are then in a condition to be used as a pair for taking stereoscopic pictures.

There may be great dissimilarity of form and construction between two such tubes, and the pictures may not be equally perfect with the same exposure, yet the difference in the results in this respect will not be very detrimental when the pictures are mounted.

Our readers will thus see that they have a simple means of adjusting their own lenses to an equivalent focus, without sending them to an optician to have the components of one of them ground and polished to other curvatures, an operation which is very troublesome and expensive when properly performed.

We have been compelled to make this sort of adjustment on a pair of Harrison's stereoscopic lenses, which were returned to the manufacturer for correction; but the practical optician failed by grinding and polishing in succeeding to the extent desired. They were sent back as corrected, and we were obliged to resort to the expedient here placed before the reader, in order to make the final correction.

The self-same expedient we have, in like manner, been compelled to apply to a pair of the globe lenses. But in the latter, the correction to be applied being small, it was not necessary to cut the brass tube in two, but simply to unscrew the front lens of one combination a couple of turns or so.

Recent Patents.

PHOTO-BINOGRAPHS.

BY EDWIN PETTITT.

Our readers are already familiar with Mr. Pettitt's theory of photo-binography. His specification will place on record a full statement of the case. It is as follows:—

My invention consists of the method or process, hereinafter described, for the production of one photographic picture from two photographic images, the one superimposed upon the other, which picture possesses great relief. Pictures so produced I designate "binographs." If I desire to produce a life-sized portrait, I proceed, in the first place, to take a double negative of the sitter by means of a pair of lenses and a camera obscura in the usual way of taking ordinary stereoscopic negatives, and having obtained a satisfactory double negative, I separate the two pictures and transpose them, placing the right-hand picture to the left, and the left to the right; and in this order I cause light to be passed through them in a dark room or camera obscura, and receive the rays so passing through the pictures by a pair of lenses placed at the same distance from them as the pictures were when taken, and the two pictures now become enlarged, coalesce, and are superimposed upon each other at or near the distance from the lenses at which the sitter was originally placed when the double negative was taken. The actual distance is governed by the focal length of the lenses. If the same lenses are used for the binograph as were used in taking the double negative, the distance is the same as that at which the sitter was placed. The compound image is received on a sensitive photographic surface situated parallel to the negatives, and at such a distance from the lenses as to receive the sharpest image the lenses will give. There is thus produced a portrait which is a negative by reflected light and a positive by transmitted light. This picture may now be varnished, painted, or backed with any white opaque or semi-opaque substance, as wax, cement, plaster, or paper.

If a smaller picture is required, I increase the distance between the double negative and the lenses, the former of which I separate, or I bring the latter closer together, according to the size of the picture I require; but if a larger picture is wanted, the lenses and double negatives are brought nearer to each other.

A binographic picture can also be obtained from two pictures without separation or transposition of the double negative. If I wish to produce copies of the said binographs, I do so in the manner commonly practised in the copying of ordinary photographs with a single lens, or I take a direct positive or negative from the binographic image as thrown upon a screen. To effect this, I place a second camera obscura at the back of the screen, which must be semi-transparent if a negative be required, and before an opaque white screen if a positive is desired.

In carrying my invention into effect, any of the ordinary photographic sensitive surfaces may be employed, such as collodion on glass, waxed paper, albumen, or other transparent or semi-transparent sensitive surfaces. I do not confine myself to exact distances at which the lenses shall be apart, but two and a half inches is the distance at which the most truthful effect may be obtained.

Negative pictures produced according to my invention are adapted for printing on paper and other surfaces as is usual with ordinary photographic negatives. But in this case a double transparent print on glass is first taken from the double negative, and the binographic negative is enlarged from the said transparent print or positive.

The advantages possessed by the pictures produced according to my invention are that a greater amount of truth of perspective and appearance of roundness and solidity is obtained than can be obtained with a single lens in the ordinary way.

The instruments and processes which I employ in carrying my invention into effect are those ordinarily employed in the practice of photography. I prefer to employ a camera obscura having two lenses, the axes of which are parallel and in the same horizontal plane, such as is commonly used for taking stereoscopic negatives. I prefer to place the lenses with their axes two and a half inches apart, but I do not limit myself to that distance. In order that the axes of the lenses may both be parallel during the taking of the pictures, with a vertical plane passing through the middle of the camera obscura, and also the middle of the head or object to be taken, I prefer to fix on the top of the camera obscura two sights, one of the said sights being at front, and the other at back. The said sights are in a vertical plane exactly midway between the axes of the lenses. The back sight has a small hole or perforation, and the front sight has a larger hole with cross wires in it. By means of these sights the middle of the camera obscura is pointed directly at the point of the object to be focussed.

Having now described the nature of my invention, and the manner in which the same is to be performed, I wish it to be understood that I do not limit myself to the precise details herein described, as the same may be varied without departing from the nature of my invention; but I claim as my invention the method or process, substantially as herein described, of producing photographic pictures having greater truth of perspective and an appearance of greater relief than ordinary photographs.

EXPERIMENTS ON THE DEVELOPER—SUBSTITUTES FOR THE BROMIDES.

BY WM. A. TERRY.[*]

As considerable attention appears to be directed at present to the chemicals, and especially to developing solutions, perhaps a few experiments of mine may not be without interest. Mr. Lea's gelatine developer appears to have attracted much notice; I think that when prepared as is now recommended, its action is chiefly mechanical, the viscid nature of the solution preventing the rapid deposit of silver having the retarding effect of free acid, without its corrosive properties.

The sulphuric acid that is generally recommended does not appear to have much action on the gelatine at the temperature at which it is used; but it may produce some effect in the developer, by the formation of the double sulphate of ammonia and iron, when neutralized. The action of dilute acids on gelatine, at the proper temperature, is to prevent its "setting" or gelatinizing when cool: for this purpose nitric acid, and the process by which liquid glue is made, is best.

As liquid glue is always convenient in the laboratory or family, perhaps some of your subscribers may like to know how it is made. Unfortunately, from the variable nature of these organic compounds, no weights or measures can be given with accuracy; the principle of the operation should be learned, and the precise quantity determined by experiment, with the sample used. Dissolve one pound of glue in sufficient water to cover it, and after boiling it till completely dissolved, cool it below the scalding point, and stir in ½ ounce of strong nitric acid; some samples will require 2 ounces or even more, while with others ½ ounce may be too much; it is best to use too little rather than run any risk, as an excess of acid is ruinous. When thoroughly incorporated, raise the temperature rapidly to the boiling point, and boil until the effervescence has subsided; when quiet, take out a portion and cool to about 160°; if it should "set" at or above this temperature, repeat the operation with more acid until the glue remains liquid when cool. Too much acid will destroy the glue, but if the operation be carefully performed, it is even more tenacious than before, and will keep for years without souring or moulding, and is far superior to that commonly sold as liquid glue, which contains acetic acid, and is corrosive and unreliable, the nitric acid in this process being entirely destroyed in the reaction with the glue. With poor glue the process sometimes succeeds better to add dilute acid to the glue while boiling, but in this way some portions of the glue are apt to be too much acted on, while others are unaltered. Gelatine may be prepared by this process, and will be ready for use at all times for all purposes where its gelatinizing or "setting" properties are not required.

It is well known to chemists, that a viscid solution modifies the action of chemicals; indeed, so much is this the case, that in electro-plating, where the forces are nearly balanced, it is only necessary to render the solution viscid to cause a deposit of metal, instead of evolution of hydrogen. If albumen is used in the developer, it should be largely diluted, as a strong solution is coagulated by the silver in the filter, causing loss and weakness of image: gelatine is also precipitated by the persalts of iron. Sugar, if added in considerable quantity to the developer, produces a marked effect, both by thickening the solution and by its solvent properties. I have used it for years, modified by the action of acids, in a developer for positives, to get rid of the yellow and dirty grey tinge which is given by acetic acid. Most of the neutral salts, particularly those of ammonia, affect the developer, by their power of dissolving the metallic oxides. It is a fact familiar to most operators, that an old developer works cleaner and better than one just prepared; this is partly owing to the restraining action of the persalts of iron, formed by oxidation, and in some cases to a peculiar vinic compound formed when alcohol is present. This is plainly seen by strengthening a developer some months old, and in this connection I would like to call the attention of experimenters to the sulpho-vinic acid and analagous compounds in the developer, instead of acetic. The value of a developer depends of course on the nature of the image formed, which should be soft and full of detail; the intensity is of less consequence, although a very thin negative is apt to be flat or harsh when intensified. The size of the crystals of which the image is composed varies greatly with different developers. By using saccharine compounds in connection with strong acids, I have developed an image in which the metal was in a reguline state, and shone like burnished silver, and I think that in most of the acid viscid solutions there is a tendency to lateral deposit and coarse crystals; in some instances the crystals are so large as to be distictly visible, but by reducing the amount of free acid we reduce the size of the crystals.

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[*] *American Journal of Photography.*

I have produced negatives of a peculiar fineness and softness by using glycerine without acid in the developer; the glycerine of commerce will not answer, as it is contaminated with chloride. But I think the finest deposit I have seen was produced in the course of my experiments with the stearate, margurate, and oleate of iron (or, in other words, iron soaps); these compounds having an alkaline reaction, of course cannot be used without powerful restraining agents. I used them in connection with saccharine compounds and salts of ammonia, and succeeded in getting an image, while the developer retained its alkaline state; the deposit was so exceedingly minute, that the colour of the image was nearly black. I found to my surprise that I could mix this solution with the ordinary developer, containing acetic acid, without decomposition, and although it oxidized so rapidly that it became of the colour of amber ale in a few hours, it still produced a marked effect upon the development. I have a solution now in use, so old that it has had to be strengthened with protosulphate several times, and still shows its peculiarities; if the solution is quite strong the image appears to start out suddenly, very much as if nitrate of silver was used in the bath. I think it may yet be possible to develop with an alkaline iron solution from a bath of ammonia acetate, thereby securing the greatest possible sensitiveness. The difficulties appear to be the forming a soluble alkaline, double compound of protoxide of iron and the rapidity of its action, which make it difficult to prevent its precipitating the silver before forming an image. And here a query occurs to me—Does not the action of alkaline pyro on a plate prove that the change produced on the film by light is chemical instead of physical?

I notice in your last number an announcement of a process for making collodion with a chloride instead of bromide. This is somewhat ancient. Several years since, when the Cutting patents were making some stir among photographers, I made collodion with chlorides, and furnished several of my acquaintances in the business with it; and so satisfactory did it prove, that a year or two after the excitement was over I received an order from one of them for more, as he said it worked the best for negatives of any he had ever used. I used it myself exclusively in my gallery for more than a year; but finally, in the press of business, I found it inconvenient to make my gun cotton, and gave up the manufacture. In the course of my experiments on collodion I found I could make it without either bromide or chloride, by the use of certain salts of silver, and also in other ways, so that it was almost impossible to distinguish it from that made with bromide; and indeed I was almost forced to conclude that the bromide played no part whatever in the formation of the image; that the superior sensitiveness of collodion containing bromides over that made with iodide alone was owing in great measure to its effect on the physical or mechanical structure of the film. It is true that an image may be developed on bromides alone, as well as on chlorides, cyanides, carbonate and fulminate, and also saccharate, and many other salts of silver, but the impression is produced so much more slowly than on iodide that it is difficult to see how it can produce the effect by any direct action. Any one who has manufactured gun cotton and collodion to any extent knows what a vast difference in sensitiveness in collodion may be produced by different samples of cotton, as cotton which is gelatinous instead of glutinous while dissolving, and gives a tough and thick film, will sometimes be very deficient in sensitiveness, requiring a greatly prolonged exposure, and then giving a faint and imperfect image. Take this collodion and add alcohol diluted with from quarter to half water in sufficient quantity to change the structure of the film to the point where it is approaching rottenness, and it will be found to have produced a great change in sensitiveness; the collodion will now develop a picture near, or quite as quick as any, and that without any addition of chemicals, merely by the simple change of structure in the film. The increase of sensitiveness is sometimes as great as that produced by the addition of bromide or chloride to simply iodized collodion. Many salts will also produce this effect even in collodion without bromide; of this fact I think I gave a hint in an article published in your journal a year or two since, though of this I am not sure, as I have not the number to refer to. I hope these patent impositions will put the public upon their guard, and that everything used in like occupations will be put upon record. The first use of bromine in Daguerreotyping might well have been patented; but the use of bromides in collodion was neither an invention or discovery, it was simply a natural consequence of its previous use.

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Proceedings of Societies.

American Photographical Society.

The Society met at its rooms on Jan. 8th. President **Draper** in the chair. O. G. **Mason**, Secretary.

The minutes of the previous meeting were read and approved.

Mr. **Thomas H. Johnston** was elected to membership.

The **President** laid before the Society a photograph of the moon, made upon silvered glass. The mercury forming the image had penetrated the film of silver, and showed itself clear and distinct upon the side opposite the one on which it was originally taken. The picture was examined with great interest, after which the President read a paper, contributed by Dr. Henry Draper, upon the "Use of Silvered Glass in the Daguerreotype Process" (see p. 137).

Mr. **Newton** laid before the Society a series of very fine prints from negatives made by the use of collodion, in which no bromide was used. The prints would bear favourable comparison with those made by the use of bromide. Mr. Newton thought that less time was required in the camera than with the ordinary process. The new collodion did not require any modification of the silver bath or developer; the manipulation in its use was identical with that of the ordinary collodion; its keeping qualities seemed as good, or even better, than those of bromized collodion.

Mr. **Hollenback** called attention to a new style of collodio-chloride print upon silver plate or galvanized copper.

Mr. **Chapman** spoke of the advantages of having some less fragile material than glass upon which to print the collodio-chloride pictures.

Prof. **Seely** spoke of a backing material which he had patented several years ago, and explained the feasibility of using it in the collodio-chloride process.

It was suggested that very pretty effects could be produced by the use of material similar to that upon watch dials.

Prof. **Seely** enquired whether any member had used Mr. Carey Lea's developer?

Mr. **Chapman** had used one very similar, but not the exact formula of Mr. Carey Lea. It worked well for negatives, but was not suitable for positives.

Mr. **Hudson** stated that he had successfully used, during the last few months, a developer made of bi-sulphate of potash and iron, in the proportion of three-quarter parts by weight of iron, and one quarter bi-sulphate of potash. In warm weather it might be advisable to use about equal parts of each. To increase the intensity on the plates, a little sugar may be added, and the developer boiled a few moments.

Prof. **Seely** remarked that many had failed to follow Mr. Lea's directions in preparing his developer, and some others had failed after following the directions of the inventor. The theory of the developer was not a new one; he stated that he had in his office some twenty-five pounds of the saccharine sulphate of iron, which was made about ten years ago for the development of photographic images. It was used but little, dropped out of notice, and was laid on the shelf, where it has since remained.

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Correspondence.

MR. CHERRILL'S THEORY OF DEVELOPMENT.

Sir,—In a late number of your Journal Mr. Nelson K. Cherrill is made to say that no argument has been urged against the equations:—

$$(1)\ 3\,Ag\,O\,NO_5 + 6\,Fe\,O\,SO_3 + 3\,Ac\,O_3\,HO =$$
$$2\,Fe_2\,O_3\,3\,SO_3 + Fe_2\,O_3\,3\,NO_5 + 3\,Ag\,O\,Ac\,O_2 + 3\,HO$$
$$(2)\ Ag\,O\,Ac\,O_2 + HO = Ag + Ac\,O_3\,HO.$$

I had imagined that the contrary was true; but as Mr. C. thinks his theory of development still intact, allow me to state my objections to it in as few words as possible.

Of the first formula (1) I would observe, that it describes two reactions, or assumed reactions, not necessarily connected. The first, that between nitrate of silver and protosulphate of iron, is well known, and has never been disputed. The result of it is the production of certain per-salts of iron and silver which, in the act of separation from its compounds, we call nascent silver. This is true, but it is not new.

The second reaction represented by this formula (1) supposes that silver in the nascent state deprives acetic acid of its oxygen, to form oxide of silver, which in its turn combines with the aldehydic acid produced by the deoxydation of the acetic acid, to form aldehydate of silver and water.

$$\overset{\text{(Nascent.)}}{Ag} + Ac\,O_3\,HO = Ag\,O\,Ac\,O_2 + HO.$$

This is Mr. Cherrill's hypothesis. It is new, but is not, I contend, true.

Not only has Mr. Cherrill failed to give us a single fact to show that the change really takes place, but he distinctly shows, by his second formula, that it cannot possibly take place, as we shall see in collating the two. That formula—

$$(2)\ Ag\,O\,Ac\,O_2 + \overset{\text{(Also Nascent..)}}{HO} = Ag + Ac\,O_3\,HO$$

—tells us that aldehydate of silver and water are converted into acetic acid and silver, which, in the act of separation, must be also in the nascent state. This reaction is a well known fact. We have only to heat a solution of the silver salt in question, when the metal is readily deposited, and acetic acid formed.

Now why, under the influence of a slight disturbing cause, does aldehydate of silver and water become acetic acid and nascent silver—the oxide of silver giving up its oxygen to the aldehydic acid to constitute acetic acid? For the reason, that the sum of the affinities on the right hand side of the equation is greater than the sum of those on the left—that is, the attraction of oxygen for the elements of aldehydic acid to form acetic acid is greater than that of oxygen for silver, the affinity of aldehydic acid for oxide of silver.

We will now go back to the formula which represents the reaction which Mr. Cherrill has assumed:—

$$Ag\ (\text{nascent}) + Ac\,O_3\,HO = Ag\,O\,Ac\,O_2\,HO.$$

Why, in the absence of all facts to prove this reaction, does Mr. C. suppose it to take place? By what force is acetic acid supposed to be split up into aldehydic acid and oxygen, to form with the nascent silver aldehydate of silver? We know no force operating but that of chemical affinity. If the reaction take place at all, it must be that the balance of affinities preponderates in the combinations on the right hand side of the equation. The sum of the affinities which form aldehydate of silver and water must be greater than the sum of those which hold together the elements of acetic acid, nascent silver being present. But we have shown by formula (2) that the sum of the latter is less than that of the former—which is absurd.

Indeed, a mere comparison of the propositions stated by the two formula will show that both cannot be true.

The first states, that nascent silver and acetic acid in presence of each other are converted into aldehydate of silver and water. The second denies this, and tells us that aldehydate of silver and water are converted into acetic acid and (nascent) silver.

Mr. Cherrill will probably say, that the wonderful properties of the polarized plate intervene and influence the action of the substance in question. I reply, that the decomposition of the developer, ending in the precipitation of silver, takes place in a clean glass vessel in the dark, as well as upon the exposed plate, if time be allowed, and therefore without the intervention of any disturbing cause except the balance of the affinities of the substances reacting.

On a future occasion I may, with your permission, show:—

1. That Mr. Cherrill's theory is not only untrue in fact, but that it is gratuitous and unnecessary, all the phenomena of development being perfectly explicable without it.
2. That it is imperfect, being insufficient to account for the whole of the phenomena.
3. That it is unphilosophical, tending to make the retarding influence of acetic acid in the developer an isolated fact, instead of part of a general law true of all acids used for that purpose.—I am, sir, yours truly, J. R. Johnson.

PORTRAITS AND PICTURES.

Sir,—As I gather from the articles that appear in your columns that the proper place for the horizontal line in a card portrait does not appear to be definitely settled, may I be permitted to make a few remarks upon the subject? A spectator looking at a point in the horizon will have the image projected upon the retina divided by the horizontal line into two equal parts, upper and lower. The same rule holds good with the lens and camera, and is *invariable;* but as it is a maxim generally admitted that a picture should be seen under an angle of about 60°, it becomes necessary to cut off a portion of the foreground. The artist does this by drawing his base line at a distance from the point of station nearly equal to the width of the picture. The photographer effects the same object by the use of the sliding front. The horizontal line is not altered, but the foreground that was in false perspective is cut away, and the lens does not include the whole of the subject *vertically* that it is capable of rendering, because the picture is no longer a square nor a circle, but assumes a proportion of something like 9 to 7.

It is admitted that the horizontal line is on a level with the eye of the spectator, and this rule holds good in every case; but it must be remembered that the model is not the spectator, and that he can sit or stoop below the horizontal line, or rise artificially above it. This will explain the reason why, in figure subjects, the figure is occasionally absolutely below the line: but these subjects are not pictures properly speaking, but a figure or a group of figures, subject to the whole of the laws of drawing, but with the top and sides of the picture cut away, because they are unnecessary, and would, in most instances, mar the intended effect; the figures, and the figures only, are the point of interest, and may be likened to a choice bit of foliage, or a few ferns, &c., &c., photographed for the sake of its beauty, occupying the whole of the plate, and subject to the laws of drawing and perspective, but still not considered as a perfect picture, but simply as a part of one.

Now, sir, in my estimation, all this has nothing whatever to do with portraiture. We are not expected to produce a figure subject to the rules of picture making, but to represent an individual under his best aspect—to do him justice—or more than justice; and the artist begins by placing him upon a platform, thus artificially raising him above the horizontal line, in order to gain height and dignity; but the photographer is restricted by the capacity of his lens. If he lowers it, he gives importance to the inferior features; if he carries it too high, although he may not get a "bird's eye view," he gets a view the reverse of dignified: he must therefore be careful not to rush into either extreme, but place his lens at such a height, that while it does not give undue prominence to the chin at the expense of the forehead, it does not shorten the neck and bury the head in the shoulders. He may now take a line through the axis of the lens to the background, and call that the point of sight in the horizontal line (of course, if the model sits, the lens must be lowered also to get the best view of the face), and rest contented that he has done the best he can with the means at his disposal, his object being to secure a dignified and pleasing portrait of an individual, to which everything else shall be subordinate, and not to compose a figure painting, nor a landscape with figures.—I am, sir, yours respectfully, R. A.

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Photographic Notes and Queries.

Sir,—From long experience as a practical photographer, I feel myself competent to give a decided opinion on the subject of Mr. Edward Seeley's communication, if on no other.

This gentleman has been "obliged to send lively infants away when a midsummer sun has been blazing with its full power," in consequence of his studio being overheated, and not the blueness of the sky.

Heat can entirely prevent the formation of the latent image, and also destroy it when formed, the injurious action of this effect commencing from 80° Fah.; hence the paramount importance of preserving the atmosphere of the operating rooms at a moderate temperature.

A studio carefully shielded from direct solar rays during the summer months not only conduces to the comfort of sitters, but also enables the operator to produce good work during the hottest of our summer days; at least, this is my experience in my own studio.

With respect to the theory I have propounded as the cause of the equal diffusion of natural light, perhaps the following experiment will tend to dissipate any lingering doubt of its truth.

A tube of any convenient length and size, slightly enlarged in the centre to avoid reflection from its sides, and furnished with a slit opening to view the interior, is to be so placed that light from either a natural or artificial source can traverse its entire length. Now, if the popular idea be correct, that the equal diffusion of light is caused by the multitudinous reflections it suffers in its passage through the atmosphere, the spectator, being in darkness, ought, on looking through the slit at the interior of the tube, to find it full of light: if, on the contrary, no light is seen, it is a plain proof the atmosphere cannot reflect it.—I am, sir, respectfully yours,

Yarmouth, March 19, 1866. Thomas Ayers.

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Talk in the Studio.

Camarsac's Enamels.—M. Silvy has just issued an interesting pamphlet, giving a large amount of information in reference to M. Camarsac's enamels and his own agency for them. The sizes and prices of the various plates are given, both for those on a copper ground and those on a gold ground, the latter possessing certain advantages in purity of result, the copper oxidizing and slightly uniting with the enamel in burning. Photographers are informed that a 5 by 4 transparency and a print are required, and the quality described. M. Silvy has opened a permanent display of specimens in various sizes and styles of these exquisite enamels, and will be happy to show photographers not only these, but the negatives and transparencies which produce the best results.

Photo-Relief Printing.—The *Scientific American*, referring to our recent presentation print, says:—"We have lately had the pleasure of receiving from the editor of the London Photographic News, a specimen of this new art of printing, which, in its details of light and shadow, softness, and artistic finish, is all that could be desired. This new process is exceedingly simple, and there is hardly any limit to its application. It is admirably adapted to book illustrations, and for many purposes will supersede wood and plate engravings. Natural objects can be photographed, and then reproduced upon metallic plates for printing, with a fidelity and harmony in the gradation of tints which handwork cannot possibly imitate."

Photo-Relief Printing in America.—We notice, in a recent list of new patents in the United States, the following:—"Mode of Printing Photographs.—W. Bentley Woodbury, Manchester, England:—I claim the use, in connection with the plates herein described, or with any engraved plate, of semi-transparent or partially transparent inks, substantially in the manner and for the purpose specified."

To Blacken Zinc, Etc.—Make a solution of six parts of chloride of antimony in one part of alcohol and four parts hydrochloric acid, and apply it to the object with a brush. Wipe the metal over with a wet cloth, and then apply the solution a second time. Now dry the object as quickly as possible in a warm place. When it is perfectly dry, rub it all over with oil.—*Deutch. Illust. Gewerbzig*, 1864.

Photography and Painting.—A contemporary, in commenting on the excellent letters of the *Daily Telegraph* Special Correspondent in Jamaica—Mr. Godfrey Turner, we believe—incidentally pays a pleasant compliment to photography, as follows:—"The letters of the *Daily Telegraph* commissioner are the best of the lot, graphic, yet to the point; amusing, yet not egotistic. How original—how much more life-like—is this, compared with the old-fashioned dry and tough reporting. It is like photography to portrait painting—as superior as Messrs. J. and C. Watkin's photograph of Grant, the new President of the R.A., to their copy of his portrait painted by himself some years since—'as sunlight unto moonlight.'"

Photography in a County Court.—We have received another letter from Mr. Charles Knight, of Killigrew Street, Falmouth, thanking us for having obtained the explanations which relieve him from the charge of "caricaturing an English lady, and then summoning her to the County Court." We regret that the mis-spelling of the name in the local prints should have caused Mr. Knight this annoyance. It appears that the correct name is a German one, and is spelled "Knecht."

Lecture on Photography.—A Fife paper forwarded to us, contains an excellent lecture by the Rev. J. Cochrane, on photography, in which its history and details were admirably set forth. Some fine enlargements from the studio of Mr. Diston, of Cupar, and other photographers, were exhibited as illustrations.

Methylated Spirit.—We are requested to state that Mr. Solomon is licensed dealer in methylated spirit and stills. Mr. Rouch has for some time, we understand, held a licence for the sale of methylated spirit.

Photo-lithography.—We have received recently several very promising specimens of photo-lithography from Messrs. Bullock Brothers, of Leamington, produced by the process they have recently patented. We shall have more to say on the subject shortly.

Vesuvian Tea.—Most chemists are familiar with that interesting experiment of manufacturing a spoonful of fine, crisp, well curled leaves of green tea from a crystal of bichromate of ammonia not bigger than a barley-corn. This experiment has now been introduced as parlour magic as a sequence to the Pharoah's serpents, by Messrs. Solomons, who supply small boxes of the bichromate and a small tin chafing dish for applying the heat, all compact for public use, under the name of "Vesuvian Tea."

The Gentlewomans' Artistic Employment Institute.—A meeting was held on Friday evening at the Royal Benevolent Society's Rooms, No. 10, Duke Street, St. James's—the Marquis Townshend in the chair—to establish the above institution, which, as its name imports, is intended to enable ladies in reduced circumstances to be taught the art of colouring photographs as a means of genteel livelihood. Madame Una Howard, of Bessborough Street, produced many letters from ladies who wished to be so instructed, including daughters and widows of clergymen, officers in the army and navy, and others who have moved in genteel life. A council was formed, with power to add to their number. The Marquis Townshend agreed to be the treasurer, Alderman and Colonel Wilson to be one of the vice-presidents, Mr. Alderman Lusk, &c., &c., with handsome donations, the Marchioness Townshend, Mrs. Lusk, and other ladies being also liberal donors. Mr. John Robert Taylor will continue to act as the honorary secretary.—*Morning Post.*

To Correspondents.

⁂ We have to bespeak the indulgence of our advertising friends, many of whose announcements were compelled, from the pressure on our space, to stand over last week, and many more this week.

To Agents and Advertisers.—Next Friday being Good Friday, the Photographic News will be published on Thursday, March 29th. Advertisers should send in their announcements not later than Wednesday, the 28th.

Louisa.—Coating your accessories with a distemper colour is easy. Burnt umber, with a little whiting, will make a very agreeable drab or brown tint. Use it with sufficient size to make it bind well, otherwise it will rub off readily. Oil flatting would answer, in some respects, better than distemper, but it requires more technical knowledge to prepare and apply. 2. The products of combustion of common gas might easily become injurious in a dark room if it were not well ventilated; but if a current of air be kept circulating now and then, a small gas jet will do no harm.

H. N.—We stated that both the length of the paper and its tone needed apology, and we gave the reason why it was inserted. We do not think a similar occasion will occur in which we shall have, in like manner, to trespass on the patience of our readers; and we shall thus, we hope, in future, avoid your censure for giving insertion to what you style "humbugging nonsense" and "sheer bosh."

T. A. (Newcastle).—Thanks for the information; we will act upon it at once.

Frewyn.—You may either filter or decant, which you find most convenient. The printing bath containing gelatine should be warmed slightly to make filtering easy. For a person who only prints occasionally, we should recommend the use of a plain nitrate of silver solution. For open-air portraiture it is desirable to use a background with canopy projecting five or six feet, to protect the head from direct top light, and with wings projecting about the same amount, which, being attached to the background by means of hinges, would permit the side light to be regulated. It is probable that you kept the tincture of iodine too long on the varnished negative; a very short time suffices to change the dense portions from grey to a non-actinic olive tint. Blisters are almost entirely confined to *Rive* paper. It is probable that you use *Saxe.*

S. Aatidge sends us some prints toned with a solution in which the chloride of gold is neutralized by lime water. The colour is an excellent black. Thanks for the little landscape. It is a very pleasing picture. A little excess of front light in the portraits.

W. G. Huntea.—We shall have pleasure in proposing you as you desire.

Amateur.—In working the carbon process, the india-rubber solution is applied to the paper and to the tissue by floating, in the same way as albumenized paper is floated on the silver bath. You do not make clear the nature of your second question. State it more fully, and we will endeavour to help you.

Henry H. Hele.—We have never known a printing bath work badly because of the accumulation of organic matter; on the contrary, if the strength be kept up, it often improves. We prefer to use the printing bath neutral. An acid bath will often cause mealiness. An alkaline bath often gives very fine results, but it is troublesome to work. The kaolin may be kept at the bottom of the stock bottle. We prefer to decolourize with chloride of silver. In the case in question, it is probable that the chief fault is in the toning bath, which appears to have become inactive from age, alkalinity, or possibly a slight contamination with fingers which have touched hypo. We have known just such a result arise from the last-named cause. We fancy the negative of enclosed print is a little thin, which would tend also to the same end, if other causes were present. When a negative is thin and prints through in the face before the deepest shadows have bronzed a little, it is difficult to get a good tone if the toning bath is not in the best order.

Tyro.—The only safe mode of getting entirely rid of the ether will be to boil down the bath to dryness; but you may try the plan you mention first. As a rule, we prefer, for our own use, the saccharated iron developer, using in winter 30 grains of protosulphate of iron, 10 minims of acetic acid, and about a drachm of sugar candy per ounce. For summer use we should reduce the iron to 20 grains.

Yankee.—There are three American photographic journals:—*Humphrey's Journal*, edited by Dr. Towler, and the *American Journal of Photography*, edited by Professor Seely, both published fortnightly, in New York; and the *Philadelphia Photographer*, conducted, we believe, by Mr. Wilson and Mr. Carey Lea, issued monthly, in Philadelphia. The latter always contains a photographic illustration. They can all be procured, we believe, through Mr. Trubner, of Paternoster Row.

Subscriber from the First.—We believe that the National Portrait Exhibition is already full, and that further contributions cannot be received. You will obtain definite information, however, by applying to the authorities at the South Kensington Museum. The early numbers of the Photographic News are not likely to be reprinted.

P. C. J.—Of the lenses in your possession, we should say the 3rd mentioned will be decidedly best for enlarging.

X. Z.—To avoid the difficulty you name, it will be well to use the smallest possible body of gelatine. The heat necessary for vitrifying the colour will generally be sufficient to destroy the organic matter which holds the colour. 2. On page 340 of our last volume you will find a process of submitting a collodion transparency to alternate baths of chloride of gold and nitrate of platina, to secure a deposit, which, when burnt, gives a fine black.

M.—Your strictures are very just, but, if inserted, would elicit rejoinders from the writer, *more suo*, which we wish to spare our readers. One good practical suggestion, one hint which will aid photographers in producing more artistic pictures, is worth more than all the frothy declamation and affected smartness contained in the paper referred to, and all similar productions. You are right in your conjecture as to the existence of a personal animus inspiring much of the denunciation; of its origin or cause, however, we know nothing.

Respice Finem.—See answer to "M." We shall be glad to receive the practical communication you name; but we do not wish to engender controversy, which leads to nothing.

E. Simmons.—We are uncertain of the cause of the spots, but believe them to arise from a defect in the paper.

Kent.—We do not know anything of the person or the book. It is somewhat curious that in glancing at the extracts given in the notice to which you refer, they struck us as very familiar; and on examining carefully, we discovered that the bulk of the matter was our own, appropriated with scarcely any attempt at varying the phraseology. The matter in question is chiefly taken from our various Year-Books. 2. The cards will certainly look better if the enamel do not extend over the margin. You will find it much easier to enamel the prints before mounting than after. Which method are you adopting?

Diogenes can write well and instructively. Why should he so often waste his time by writing, not for the purpose of teaching something, but to ridicule something? We do not at all agree with the communication he denounces; but the writer would not be convinced that he had been wrong simply because he is denounced and laughed at, without attempt at disproof. We shall be glad, at any time, to receive communications from the correspondent signing "Diogenes," if he will state some of his practical experiences—details, for instance, of his photo-press-printing process. Such communications are far more interesting and useful than those which sneer, or those which cavil at even worthless things.

J. Clevere Jones.—Thanks. The address has not yet arrived.

Ignoramus.—We do not remember a bottle so labelled in the series of colours you mention; but it doubtless contains a solution of wax to be applied to the pictures after colouring. Did you not receive a paper of instructions with the colours?

Observer.—See answer to "M." above. You are perfectly right in stating that photography needs "honest and earnest men" as teachers, and we regret that we cannot assure you that the person to whom you refer is the right man for the mission. We like to see *con*struction not *de*struction; teaching, not declamation and denunciation.

P. G. W. (Lincoln).—We shall have pleasure in seeing the examples to which you refer, and also to hear something more of the process.

M. Burdon.—Read the paper, by Mr. Brothers, "On Celestial Photography," which appeared in our issues for January 5th and 12th; you will there learn the arrangements necessary to secure certain results. 2. Unless the exposure were very rapid, a blurred and ill-defined image could only result from the use of a stationary plate. 3. You will learn more from the paper to which we have directed your attention than we could possibly suggest in this column.

Received, and will be noticed shortly:—*Annuaire Photographique pour l'Année* 1866, par A. Davanue; and *Traité D'Optique Photographique*, par D. V. Monekhoven.

Several Correspondents in our next.

Photographs Registered.

Mr. T. Bennett, Worcester.
Photograph of Rupert Kettle, Esq.
Photograph of Group executed by Mr. Forsyth, Sculptor.

Mr. John Stuart, Glasgow,
Four Photographs of Bishop Gray.

Messrs. Brown and Wheeler,
Photograph of Group of their Serene Highnesses the Prince and Princess Hohenlohe, and the Princess Leinengen.
Photograph of Group of Her Serene Highness the Princess Hohenlohe, Prince Ernest, and Princess Elise.

Messrs. W. and D. Downey, Newcastle,
Two Photographs of Eliza Cook.
Photograph of C. W. Ord, Esq.

Messrs. Hills and Saunders, Oxford,
Photograph of the Oxford University Boat Crew.

Mr. F. Downea, Watford,
Two Photographs of Abbotts Langley Church.

Mr. J. Nichol, Nairn,
Portrait of Dr. McDonald.

Messrs. W. W. and C. Law, Northampton,
Photograph of Queen Eleanor's Cross at Northampton.

Mr. G. W. Hastings, Workington,
Two Photographs of Soup Tureen, presented to J. Crosier, Esq.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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A RELIEF FUND FOR PHOTOGRAPHERS.

We have received several communications on the subject of the article in our last, urging the importance of establishing an organization to provide for photographers in sickness, age, or indigence. In all cases the object is warmly approved, and support offered; but in many more, information is sought as to the mode in which the idea should be carried out. As we have before said, the method of establishing and working such an association rests not with us, and we are most anxious to avoid dictating conditions. The plan must be the result of the deliberation and co-operation of many minds; nevertheless, we may briefly throw out one or two general suggestions as to the aims desirable to be kept in mind. Before doing so, it affords us pleasure to record one very definite and practical offer of aid which has reached us spontaneously. The letter we annex will speak for itself:—

Dear Sir,—Observing your remarks in the Photographic News respecting a Photographers' Relief Fund, and being fully assured that a Benevolent Society is required for the relief of unfortunate photographers, I should be most happy to offer my services gratuitously in collecting subscriptions or becoming honorary secretary to such society. If a meeting could conveniently be convened for the purpose of adopting rules, and benefit be likely to accrue by becoming a member, I think there would be little difficulty in establishing the society which you so urgently impress upon your readers.—Yours, respectfully,

Edmund Dring.

Wentworth House, Gresham Road, Angel Town, S., March 23, 1866.

We may add that Mr. Dring's name is known to many of our readers as that of a gentleman who, for many years, has had charge of the business department of this Journal, and whose experience will necessarily be valuable in connection with the duties he so handsomely offers to discharge without remuneration.

Amongst the communications which have reached us is one from "A Country Operator" who, warmly welcoming the idea, adds: "Let me urge upon those gentlemen who may take in hand the management of this scheme you propose, the importance of making the society self-supporting; let it be a Provident Society, the funds of which are contributed equitably by the members, in compliance with rules properly framed, and let the society be registered according to Act of Parliament. The members will then, in case of sickness, old age, &c., receive their proper allowance without feeling they are accepting charity. Workmen of all classes connected with photography are paid, on an average, at present, quite as well as those in other trades, and most of them could afford to contribute a small regular sum to a provident society." Another operator, expressing similar ideas, asks if it would not be possible to incorporate with some existing benefit or annuity society. "B. W. B.," an amateur, in expressing his approbation, suggests that such a society should not be simply a provident society, but essentially a benevolent society, and points out that if "it were only available for members who had acquired the right to relief by contributing to its funds, many similar cases to those appeals for which have been made in the journals would be excluded from its operations." "Many of the early workers in photography," he adds, "who are old, and, it may be, are becoming indigent, could have no admission into such a society if it were merely a benefit club, as age is generally either a disqualification for admission, or is rated so high in the tables of subscriptions as to act as a practical barrier. Whatever its organization, I think it should have a provision for the relief of those whom its governing body might consider worthy and needy, whether they had contributed to its funds or not."

There is force in the arguments of both correspondents from whose letters we have made extracts, and we see no reason why the principles advocated by both should not be embodied in one organization. We should suggest that, with the machinery of a provident society, the members of which should contribute after a rate to be decided by recognized actuaries' tables, and receive aid as a right under definite conditions and in definite ratio to be decided, there should also be the machinery of a benevolent society, the funds for which should be obtained by voluntary contributions expressly for the purpose, and which should be dispensed according to the decision of a properly elected committee. It appears to us that there is nothing antagonistic in the two ideas which would prevent them from being worked together in one general organization.

As to the best mode of commencing operations we make no suggestion at present. Nothing can be done without general interest in the matter, and a consentaneous movement. When we suggested the matter nearly three years ago, we expressed a conviction that such a movement would originate best with the Photographic Society, and we should have been glad to have seen action taken by that body. On maturer thought, it seems probable that an independent combination of interests would best effect what is desired. One correspondent, referring to the matter, says: "Above all, let the attempt be made independently of any existing society, with objects of its own to which this object would be secondary. A purely charitable association might effect a fusion of many antagonistic elements which could not be sunk or merged in any other combination."

For ourselves, as we have before said, having thrown out the suggestion, and briefly pointed out its importance, we wait for some indication of a general interest in the matter, and shall be glad to aid in giving effect to any scheme which promises best to achieve the great object in view.

DEVELOPING POWDERS.

We have recently received for trial two samples of powders to be used in developing; the first, from Mr. Ramsden, of Leeds, described as a new developing salt, consisting of a powder, brown in colour, apparently from the presence of oxide of iron. This was to be used in all respects like protosulphate of iron. The second was from Mr. De Latour, an old and experienced photographer, of Jersey: this consisted of a white crystalline salt, not unlike chloride of ammonium in appearance. It was to be dissolved in water, and a portion added to the ordinary iron developer.

The prevalence of dull weather prevented our trying either of these aids to development until recently. We tried Ramsden's powder first. A paper of instructions did, we believe, accompany the packet of this new salt; but having been mislaid, we proceeded to deal with it exactly as with a sample of ordinary protosulphate of iron. On adding twenty grains of the powder to an ounce of water, and also twenty minims of glacial acetic acid, a slight undissolved residue remained. The solution having been filtered, the two halves of a plate exposed in succession, each for the same time, were developed, one half with this solution, and the other with a fresh twenty-grain ordinary iron solution, containing twenty minims of acetic acid. The negative produced with Ramsden's new salt was decidedly the most vigorous, but apparently a slight trace less full of detail than the other. The first was rich and vigorous in colour, and had the bloom which characterises a good pyrogallic negative. Whether under the different treatment the result with Ramsden's salt might have been different, we cannot say; but the result of this experiment suggested that whilst great vigour and brilliancy were obtained, it required a slightly, very slightly, longer exposure than the ordinary developer. To those seeking anxiously for vigour, so easily attained by some, so difficult to secure by others, this powder will be very valuable, the image obtained being very brilliant and non-actinic, resembling that of a vigorous pyrogallic acid negative, and very clean and free from fog. We shall probably try this again when we have more information as to the conditions desirable, and again report.

We then tried Mr. De Latour's salt, mixing the quantity sent (apparently about a drachm) in an ounce of water, according to instructions. To this solution we then added a fluid drachm to an ounce of the ordinary twenty-grain developer containing acetic acid. We proceeded with this as with the last, exposing two negatives on the same plate, for the same time, with the same light, and the same lens, and then developing one image with the ordinary developer, and one with that containing Mr. De Latour's salt. The difference here was also very marked: the latter developed evenly and vigourously, giving a rich, intense image, with the well-known bloom of a good negative, so pleasant to see. In this case, in addition to more vigour and richness, there was also more detail, the negative being in all respects better than that produced with the ordinary twenty-grain developer, a result which further experiment has confirmed.

We have confined our remarks to the practical results of the materials sent for experiment, without entering into the question of their composition, as the manufacturers wish to supply the preparations they have introduced, and we have no right or desire to hinder them from receiving the fair reward of their efforts.

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MR. SWAN'S CARBON PATENT.

We notice that at a recent meeting of the Edinburgh Photographic Society a charge was brought against Mr. Swan of having abandoned the method of carbon printing which he had patented, and adopted or "re-discovered" a method published by Mr. Davies a year or two ago. Allusions are also made which show that some members confounded the process first published by Mr. Swan with Fargier's process. Mr. Nicol stated that Mr. Swan "had been unfortunate, in the first place, in patenting a process discovered long before by Fargier, and not less so now in the re-discovery of the method published by Mr. Davies." Mr. Davies, in corroborating Mr. Nicol, referred to the earlier method as "Fargier's, as originally worked by Mr. Swan." As an article of our own was quoted as suggesting the revived discussion of the question, it appears desirable that we should state the exact facts and point out the error, into which our Edinburgh friends have, evidently unwittingly, fallen.

We shall show that the process now worked by Mr. Swan is his patented process, duly set forth in his specification, and that the method was published in our pages before Mr. Davies published the method which he supposes Mr. Swan has recently adopted, but of which he (Mr. Davies) claims the origin. But we shall first point out the error in regard to the identity of the processes of Swan and Fargier.

The method of securing half tone in carbon printing by exposing one side of the chromated gelatine, and washing away at the other, was first published in this country by Mr. Burnett, in November, 1858. M. Poitevin accredits its first publication to the Abbe Laborde as early as July, 1858, and states that he, himself, was familiar with the principle still earlier. In December, 1860, M. Fargier utilized this idea by coating a plate of glass with gelatine containing a pigment and bichromate, exposing the coated glass under a negative, next coating the exposed surface with collodion. The whole then being plunged in water, the upper surface being protected by the collodion, the gelatine becomes softened, the film is detached from the glass, and developed on the side opposite to that which was in contact with the negative. This done, the floating film is secured and attached to a gelatinized paper. This method, although very ingenious, seems scarcely practical, and though very fine results were obtained by skilled hands, it did not promise to come into general use.

The essential feature of Mr. Swan's improvement is the formation of a distinct tissue, which rendered the manipulations comparatively easy and practical. In his process as first proposed, he formed a tissue of the pigmented chromated gelatine and collodion; this could be handled and worked with easily, and it dispensed with the necessity of placing the negative in contact with a coated glass plate, and all the risk attending it; it also dispensed with the troublesome operation of catching a flimsy and slippery film of gelatine and collodion floating in water, and then mounting. This first proposed process was, we think it will readily be seen, not only essentially different from Fargier's method, but decidedly more practical and convenient; and this was patented. The still more practical method now adopted was also patented, as we shall presently show.

On June 24th, 1864 (Photographic News, p. 305, vol. viii.) we published a communication from Mr. H. Cooper, describing a method suggested by Mr. C. K. Wyld, in which he proposed to prepare sheets of paper with the pigmented gelatine, sensitize by floating on a solution of bichromate, expose when dry with the coated surface in contact with the negative, then mount, face down, with india-rubber solution or with albumen soaked in water until the original paper floated off, and the picture then developed. In the Photographic News of the following week, July 1st, we wrote an article on the subject, pointing out the advantages of this method, and suggested some details of manipulation. In the same number we published a letter from Mr. Swan, dated June 25th, in which he informed us that he had been then for some time using the method proposed by Mr. Wyld, and that he was making preparations for preparing the non-sensitive tissue on a large scale, with a view to supply photographers. On July 6th Mr. Davies read a paper at the Edinburgh Society, in which he proposed to coat paper with gelatine pigment and bichromate, expose coated side next the negative, mount either with albumen, by a method described in the Photographic News the previous May by Mr. Henderson; or, if the image were to be transferred, mount with shellac and Venice turpentine dissolved in spirits of wine. Next soak in water until the original paper floats off; then develop. The completed picture might then either remain upon the paper upon which it was developed, or, if it were desired non-reversed, it might be transferred to a mounting-board, as Mr. Swan had originally in his first paper on the subject proposed with his collodion tissue. It will be seen that the method proposed by Mr. Davies is identical with that proposed by Mr. Wyld· a fortnight before, and endorsed a week before, except that he did not contemplate its most important advantage, namely, the preparation of the paper with pigmented gelatine, without bichromate, and sensitizing when required for use.

Referring to Mr. Swan's specification, we find that he included in his provisional specification a claim for making the "tissue" of gelatine pigment, supported by "collodion *or other suitable substance*." Paper, as at present worked, is the other suitable substance. But this is not all: in his final specification, sealed on the 14th day of September, 1864, and therefore three weeks before the reading of Mr. Davies' paper, he described fully, and with minute detail, this method of working, the use of paper, the mode of sensitizing, the adhesive materials used, and the mode of transfer mounting—everything, in short, now done!

Now let us not be misunderstood. We should be sorry indeed to charge Mr. Davies with having appropriated the process published in our pages a fortnight before he read his paper, published it as his own, and finally claimed it as having suggested Mr. Swan's present process. We would not here apply the apothegm of Tennyson in the Idylls:—

> "And they, sweet soul, that most impute a crime,
> Are pronest to it."

We believe that this is simply a mistake; that Mr. Davies had really discovered the method he described in the course of his own experiments, and, naturally enough, believed it to be wholly his own. Simultaneous discoveries of the same thing by various persons have been common in photography and in other arts; and the error is at any time to claim authorship of any process, or impute appropriation to others, without first consulting the recognized sources of information on the subjects in question. Regarding Mr. Swan's carbon patent, we think there are few processes in photography which have so thoroughly become the property of one man by the skill and perseverance with which he has conducted it from something like chaos to order, than Mr. Swan's carbon process; and no photographic patent we know, any profit arising from which, has been more deserved or better won.

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THE USE OF BROMIDES IN AMERICA.

Considerable consternation has prevailed amongst our American brethren during the last few months, on account of an attempt to enforce a patent obtained by Mr. Cutting, for the use of bromide of potassium in collodion. "The patent in question" (the *Scientific American* remarks) "was granted to James A. Cutting, of Boston, Mass., July 11, 1854, and contains the following claim:—'The employment of bromide of potassium in combination with collodion.' No suggestion or allusion is contained in the patent to the use of free bromine, or any salt or extract thereof, except bromide of potassium. The original application for the patent was rejected. The applicant then asserted that he could prove the use of a bromide basis in collodion in the month of April, 1853. The Patent Office replied, citing references conclusively showing the use of bromine long anterior to that date. Among the salts thus used was bromide of ammonium. A patent was finally granted to Mr. Cutting, with a claim to the use of bromide of potassium in collodion, as quoted, and those who use that salt appear to be infringers; but the use of any other salt or form of bromine in collodion is free to the public."

A similar patent was obtained about the same time in this country; but no attempt has been made to enforce it. With the evidence of its much earlier use by English photographers, it would be impossible to enforce the patent in this country. The matter has been pending for some years in the States, and upwards of five years ago we gave a brief history of the case; since then it has been in abeyance, until a few months ago, when Mr. Hubbard, the assignee of the patent, having, we believe, obtained a decision in his favour, commenced actions generally, not only for future use of his patent, but for retrospective claims

Many readers will exclaim, if other bromides may be used, who would trouble themselves about bromide of potassium? The answer is, that a Judge of the United States has decided, "although a patentee has not expressly claimed equivalents, he is understood to embrace them"; and that, therefore, bromine in any form is covered by the patent. That such a patent ought not to have been granted must be clear to any one really familiar with the history of the art. The use of bromine in collodion was the most obvious thing in the world, and could have escaped use by any one who had practised the Daguerreotype process. To the first sample of collodion we ever made we added **a** bromide. If we mistake not, Dr. Diamond employed bromides, fluorides, &c., in collodion when he first experimented, in conjunction with Archer, in 1850, long before the process was published to the world. Archer's "Manual of the Collodion Process" (1852) mentions the use of bromide of potassium. Mr. Bingham, in writing in 1850 on photography on glass with collodion, albumen, starch, &c., mentions the use of bromine, as well as iodine. In March, 1853, the first photographic journal was published in this country, and in the May number a detailed report is given of the April meeting of the Liverpool Society, at which Mr. Berry read a paper on "Collodion Negatives," in producing which bromide and iodide of ammonium were used. The next number contains a paper by Sir John Herschel, and another by Mr. Crookes, on the "Use of Bromides in Collodion." These are followed by sundry other papers referring to the use of bromides in collodion, all published in 1853 in the first volume of the *Photographic Journal*. It is to be remarked, moreover, that in Mr. Berry's paper, read on the 5th of April, 1853, the use of bromides in collodion is not referred to as a novelty, but as a well-known thing.

An impression prevails in America that English photographers were slow in adopting the use of bromides. This is to a certain extent true so far as the production of negatives was concerned; but the bromine salts were used in positive collodion almost from the first. The use of bromides in negative collodion was not universal until within the last few years, after we had, as our readers know, fought its battle in these pages very persistently. We have invariably used it for a dozen years past, and we do not believe its use can be well dispensed with. The use of chlorides in the place of bromides is at present exciting attention in the States. So far as our experience goes, they will promote cleanness, but not sensitiveness.

Mr. Carbutt, an able photographer in America, whose personal acquaintance we had the pleasure of making a few years ago, writes appealing to English photographers to aid their American brethren with evidence to defeat the claims made on them. We append his letter, and shall be glad if any of our readers can help:—

Chicago, U.S., February 24th, 1866.

G. Wharton Simpson, Esq.,

My dear Sir,—The agents of the Cutting Bromide Patent, finding they can make nothing out of the photographers in the Eastern States to reimburse them for their outlay in litigation and purchase of the patent, are now turning their attention to the West, ere it be too late to collect anything for the use of said patent, as twelve years of its time have already expired.

My object in writing is to secure your aid, or any of your readers, in procuring me a copy of F. S. Archer's collodion process, published in London in 1851, in which, I understand, is given a formula for bromo-iodized collodion. Either this or any other work published prior to December, 1852, containing a formula for collodion with a bromide, will answer. If it cannot be purchased, the loan of the work for a few months will do. Let it be sent by express or mail, with the bill, to my address, and the amount will be promptly remitted. I think the impression prevails in England that the patent being granted July 11, 1854, a work published prior to that date in the same year would serve to defeat the claim. This is not so, as I will briefly explain. Mr. Cutting put in his claim to the use of bromides in collodion in December, 1853, making oath and bringing witness to prove its use by him in March, 1853. The United States Patent Office rejected his claim to the use of bromine as a base, and he finally so amended his claim to include only bromide of potassium, and for which a patent was granted. There has not been a single case decided by the courts against any of the New York photographers who have been sued; they have merely settled, it being cheaper to do so, with the owners of the patent; and, as we in the West firmly believe, only to use the influence of those settlements in collecting from those they can scare into paying them. Their agent, J. W. Kuhns, has been at work in Cincinnati, Ohio, and so far, although claiming he could close any gallery refusing to pay him, only collected from one man, and then went back to New York for further instructions. This bromide patent, as all must admit, is a downright swindle; and how the Eastern stock dealers professing to have the interest of photography at heart can countenance such a humbug I cannot see; at any rate, the Western photographers express themselves as determined not to submit to it. Hoping I may soon receive the coveted publication,

I remain, respectfully yours,

131, Lake Street, Chicago, U.S. John Carbutt.

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NOTES ON PICTURES IN THE NATIONAL GALLERY.

BY J. WERGE.

In the following notes on some of the pictures in the National Gallery, it is not my intention to assume the character of an art-critic, but simply to record the impressions produced on the mind of a photographer while looking at the works of the great old masters, with the view of calling the attention of photographers and others interested in art-photography to a few of the pictures which exhibit, in a marked degree, the relation of the horizon to the principal figures.

During an examination of those grand old pictures, two questions naturally arise in the mind: What is conventionality in art? and—In whose works do we see it? The first question is easily answered by stating that it is a mode of treating pictorial subjects by established rule or custom, so as to obtain certain pictorial effects without taking into consideration whether such effects can be produced by natural combinations or not. In answer to the second question, it may be boldly stated that there is very little ot it to be seen in the works of the best masters; and one cannot help exclaiming, "What close imitators of nature those grand old masters were!" In their works we never see that photographic eye-sore which may be called a binographic combination of two conditions of perspective, or the whereabouts of two horizons in the same picture.

The old masters were evidently content with natural combinations and effects for their backgrounds, and relied on the rendering of natural truths more than conventional falsehoods for the strength and beauty of their productions. Perhaps the simplest mode of illustrating this would be to proceed to a kind of photographic analysis of the pictures of the old masters, and see how far the study of their works will enable the photographer to determine what he should employ and what he should reject as pictorial backgrounds in the practice of photography. As a photographer, then—for it is the photographic application of art we have to consider—I will proceed to give my notes on pictures in the National Gallery, showing the importance of having the horizontal line in its proper relation to the sitter or figure.

Perhaps the most beautiful example is the fine picture by Annibale Carracci, of "Christ appearing to Peter." This admirable work of art as nearly as possible contains the proportions of a carte de visite or whole plate picture enlarged, and is well worthy the careful attention and study of every photographer. Not only for its proportions and the amount of landscape background introduced, showing the proper position of the horizon and the small amount of sky visible, but it is a wonderful example of light and shade, foreshortening, variety and contrast of expression, purity of colour, simplicity of design, and truthfulness to nature. Neither of the figures lose any of their force or dignity, although the horizontal line is as high as their heads, and the whole of the space between is filled in with the scene around them. In its linear perspective it is quite in keeping with the figures, and the scenery is in harmonious subjection, controlled and subdued by aerial perspective.

The large picture of "Erminia takes refuge with the Shepherds," by the same artist, is also a fine example of a horizon high in the picture. The figure of Erminia is separated from the other figures, and could be copied or reproduced alone without any loss of beauty and dignity, or any violation of natural laws.

Murillo's picture of "St. John and the Lamb" suggests an admirable background for the use of the photographer. It consists of dark masses of rock and foliage. Nothing distinct or painfully visible, the distant masses of foliage blend with the clouds, and there is nothing in the background but masses of light and shade to support or relieve the principal objects.

In the picture of "Christ appearing to Mary Magdalene," by Titian, the water-line is above the head of Christ, but if the figure were standing upright, the head of the Saviour would break the horizontal line.

Titian's "Bacchus and Ariadne" also has the water-line breast high, almost to the neck of Ariadne. The figure of Bacchus springing from the car, as a matter of course is much higher in the sky. This picture presents the perspective conditions of the painter having been seated while painting such figures from nature, or similar to the results and effects obtained by taking a group with the lens on a level with the breast or lower part of the necks of figures standing.

In Titian's Portrait of Ariosto there is a dark foliated background which gives great brilliancy to the picture, but no sky is visible. The "Portrait of a Lady," by Paris Bardone, has an architectural background in which no sky is to be seen. The picture is very brilliant, and the monotony of a plain background is skilfully overcome.

The picture of "St. Catharine of Alexandria," by Raphael, has a landscape background, with the horizon about as high as the breast, as if the artist had been seated and the model standing during the process of painting.

Raphael's picture of "The Vision of a Knight" is another example of the fearlessness of that artist in putting in or backing up his figures with a large amount of landscape background.

The proportions of Correggio's "Venus, Mercury, and Cupid," are as nearly as possible those of a carte de visite enlarged; and that picture has no sky in the background, but a very suitable dark, cool, rocky scene, well subdued, for the rocks are quite near to the figures. This background gives wonderful brilliancy to the figures, and contrasts admirably with the warm and delicate flesh tints.

Correggio's "Holy Family" has a landscape and architectural background, with a very little sky visible in the right hand corner.

In the "Judgment of Paris," by Rubens, the horizontal line of the background cuts the waist of the first female figure, showing that the artist was seated. The other two female figures are placed against a background of rocks and dark masses of foliage. Rubens' picture of the "Holy Family and St. George" is also a good example of the kind of picture for the photographer to study as to the situation of the horizontal line.

The picture of "The Idle Servant," by Nicolas Maas, is also an excellent subject for study of this kind. It shows the due relation of the horizon of an interior in a very marked degree, and its shape and subject are very suitable to the size and form of a carte de visite. So are his pictures of "The Cradle" and "A Dutch Housewife."

The picture of "John Arnolfini of Lucca and his Wife," painted by John Van Eyck in the fifteenth century, is an excellent specimen of an interior background, with a peep out of a window on one side of the room. This is a capital subject for the study of photographers who wish to use a background representing an interior.

"The Holy Family at a Fountain," a picture of the Dutch School, painted by Schoorel in the sixteenth century, has an elaborate landscape background with the horizon *above* the heads of the figures, as if the artists had been standing and the models sitting.

For an example of a portrait less than half length, with a landscape background, look at the portrait of "An Italian Gentleman," by Andrea da Solario. This picture shows how very conscientiously the old masters worked up to the truth of nature in representing the right amount of landscape in proportion to the figure; but the background is much too hard and carefully worked out to be pleasing. Besides, it is very destructive to the force and power of the picture, which will be at once visible on going to the portraits by Rembrandt, which have a marvellous power, and seem to stand right before the dark atmospheric backgrounds which that artist generally painted in his portraits.

There are other examples of half-length portraits with landscape backgrounds, wherein the horizontal line passes right through the eyes of the principal figure, one of which I will mention. It is that of the "Virgin and Child," by Lorenzo di Credi. In this picture the horizontal line passes right through the eyes of the Virgin without interfering with the interest of the chief object.

Several examples of an opposite character are to be seen in the National Gallery, with the horizon of the landscape background much too low in the picture. It is needless to call special attention to them. After carefully examining the works already named, and comparing them with the natural effects to be observed daily, it will be quickly seen which is a truthful picture in this respect and which is a false one.

THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Amid the scrambling and elbow-jostling which, in these go-a-head days, form part and parcel of industrial life, it rarely happens that men can command sufficient leisure to indulge in retrospect; hence many useful lessons which comparative exercises convey are lost to the bustling multitude.

Such were the impressions left on my mind after a few evenings profitably spent in looking over the earliest numbers of the News, during which time I succeeded in tracing more than one valuable process from the germ to the stage of perfection. But whilst comparative scrutiny supplied reasons in abundance for rejoicing, it also reproachfully pointed to a present state of things deeply to be deplored.

The suggestions, attempted explanations, and corrections which attended photography during its earlier growth were marked by unaffected sincerity, single-heartedness, courtesy, and good will towards all the brotherhood. I turn from 1859 to 1866. Alas, how great the change! The hard-working pioneers have in most instances forsaken the field of action, and with them, to an extent too great, has been withdrawn the friendly tone which characterized their communications; perhaps to the undesirable change introduced by new recruits might be attributed the *reason why* the earlier labourers have ceased to work for the general weal.

I take the case of Mr. Cherrill to exemplify the spirit which is exercising a mischievous influence on the well-being of photography. Had that gentleman written in 1859 what his able pen has recorded in 1866, he would then have been received with open arms, and have been regarded as a second "Daniel come to judgment." But as it is, the communications offered by Mr. Cherrill are met in a spirit so bitter and sarcastic that at first sight one is almost induced to fancy that attempts at teaching imply direct affront or indignant retaliation.

Although unacquainted with the gentleman in question, I believe him to be a deep and earnest thinker, one who esteems it a pleasure, and is moved by a sense of duty, to add his mite to the general fund. Why, then, I ask (if progress is really desired), should so promising a labourer be driven from the field which already feels the profitable influence he has exercised? If from a host of important truths an error might sometimes be culled, what matter? Has not science generally waded through a sea of errors? In my mind it appears that if, amid a thousand erroneous ideas, one important truth can be gathered, 'tis worth the search, and its originator deserves the thanks of all concerned.

The theory of electro-polarization as advanced by Mr. Cherrill, so far as it concerns the foundation of the latent image, is, to my mind, the most satisfactory elucidation of that perplexing subject ever yet offered, and one which provides a key to the problem proposed by M. Carey Lea, who, from a series of ingenious experiments, has produced results which are at once inconsistent with all known physical phenomena, and incapable of being satisfactorily ascribed to chemical changes.

Without entering fully into the subject, for the information of such whose scientific knowledge is limited, I shall endeavour to aid in elucidating Mr. Cherrill's views of the matter, by offering a familiar illustration.

Although the number of atoms of iodide of silver in a collodion film is unknown, and notwithstanding the number of magnetic or actinic rays which are brought to bear on the plate is indefinite, for the sake of simplicity we will suppose one atom only of the iodide of silver to be present, and one solar ray provided to exercise an influence. Directly the light reaches the iodide of silver, a molecular change commences, the silver forming a positive pole, the companion iodine a negative one. When so situated, it is capable of exercising an attractive influence *not* sufficient of itself to decompose the free nitrate, yet imparting aid when a separation is caused by a reducing agent.

Up to the point described, no separation of iodine has occurred, but by the further action of light, the effects would be as if the wedge (which before had been only entered to its slightest self-supporting extent), was driven further in between the silver and iodine, until at length iodine would yield to the pressure, and separate from its companion; but I might here observe, according to Mr. Cherrill's theory, such separation does not occur during the formation of a latent image.

It must be admitted that up to the point described, the theory deserves more than passing consideration, more especially as it shows the *reason why* a visible image is dissolved while the latent image remains intact, and it also explains the action of iodine on a previously exposed plate. As it may reasonably be supposed that a relay of iodine would immediately attack the silver laid bare for the assault by polarization, hence neutrality would be produced, and the image destroyed.

So far, then, Mr. Cherrill seems to have good reason; but I fear that his views on the subject of development must be considered erroneous. Indeed, were they not so, the arguments he advances to support the ground he creditably occupies must be deemed worthless, as the elimination of iodine from silver, and its subsequent absorption by the developer, would tend to reduce the whole structure to one form and nature, so that an agent employed to remove the superstructure would, from sheer necessity, destroy the groundwork at the same moment.

If the first position secured by the theory of polarization is to stand, it should meet with new proofs in its favour at every step. If it does not coalesce with the most rational theory which can be offered on the subject of development, the position occupied by Mr. Cherrill must be pronounced untenable. But I contend that, in every respect, the theory of polarization fits the most favoured views entertained, that touch on the formation of a visible image by means of a reducing agent; and, to make my further arguments as intelligible as possible, I shall commence by requesting the reader to hold an imaginary collodionized plate in his hand, at the same time supposing it to have been sensitized and subsequently exposed in the usual way.

According to Mr. Cherrill's admirable theory, there exists on that plate a number of atoms existing in a state of polarization, each more or less excited in proportion to the amount of electric power exercised on it by light.

In addition to the neutral iodide and polarized iodide of silver, there is present a certain quantity of free nitrate, which, by reduction, is made to form the visible portions of the image, and the means by which the change is brought about becomes the next subject of enquiry.

Nitrate of silver is, as every photographer does or should know, an exceedingly unstable salt; so extreme is its instability that it is decomposed with facility by various compounds possessing alkaline bases, such as carbonate of soda, iodide of potassium, chloride of sodium, &c., &c. I shall not inflict a flood of symbols which the majority of my readers are, perhaps, unfamiliar with, to illustrate the change; suffice it to explain, the alkaline base and the nitric acid (such, for example, as sodium and nitric acid) are particularly fond of each other, and will quit another company to unite; so when the decomposition takes place, the ejected carbonic acid, on quitting the soda, goes over to the silver.

From this forced degression I return and call attention to the imaginary plate which, as I before observed, supports an image in a polarized state, and, as such, it is requisite we assume its possessing attractive properties.

Next, free silver is present to form the superstructure. Now I introduce the reducing agent in the form of an iron solution.

Pour a quantity over the plate—and what ensues? If the free silver were in an alkaline condition, its instability is so extreme that in a brief space of time reduction would simultaneously occur on all parts of the plate, and fogging be the result. *Remember*, polarization played no part in producing the failure.

Supposing, again, that whilst, reader, you have held the plate in your hand, diffused light has attacked the plate: fogging in such case has resulted, but brought about by a different action, which will be understood by a brief consideration of the remarks which now follow. Suffice it here to observe, partial polarization would cause a deposit on all parts of the plate.

Admitting the present conditions—faintly acid bath, acid iron solution, &c.—the maximum of force possessed both by the polarized silver and the iron solution would be exercised on the first layers of reduced silver, which, under such conditions, would separate wholly from the nitric acid, and metallic silver would be deposited; but as the two forces diminished in power, the deposition would proceed more tardily, and the silver would deposit as a brown oxide. When your plate is dry, rub its surface with your finger, and above you will perceive a dust-like deposit; below, metallic silver. From my last remarks it will be understood, as soon as the attractive force possessed by the polarized foundation is quite exhausted, the further reduction of silver, instead of being local, as before, would extend alike on all portions of the plate, and fogging by over development would ensue.

If no acid was added to the developer, simultaneous reduction would occur in the same manner as when an absence of acid was supposed from the silver; although in this last case the greed for extra oxygen enables the iron to obtain an easy victory over the neutral or moderately acid silver.

Various causes—such as dirty plates, or dark slides, or foreign matter in the bath—will interfere both in the formation of the latent image and the uprearing of the superstructure; but up to the present point nothing that would render controversy valuable seems to interfere with Mr. Cherrill's theory. It might perhaps be altogether wrong,—so also might every theory concerning chemical action yet produced; but when a theory is sufficiently plausible to base operations upon—such operations being satisfactory when concluded—I think we might safely accept it without being over curious. The mariner is aware that his compass points to north and south, and with such knowledge he launches into trackless ocean; nor cares he to inquire why the magnet points one way; nor does he doubt the stars' directing hand, because their distance from the earth is a subject of dispute.

In my next I hope to proceed with matters of a practical character, although an attentive perusal of the present paper will suggest many a reason why.

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CAN WE HAVE MORE ENERGETIC DEVELOPERS?

At a time when the attention of photographers and photographic chemists is so much directed to modifications in the developer, it may be well to consider whether it is not possible to discover an agent which possesses more energy in developing an image impressed with short exposure. M. Leahy discovered that an alkaline developer could be employed with dry plates: can as much be done successfully for the wet process? In the interesting paper by Mr. Terry which was given in our last, it was shown that even an alkaline iron solution might be used. Alkaline pyrogallic acid has been tried in this country with wet plates, but, so far as we learn, no certain success has been attained. Improved energy in developing, and, at the same time, avoiding fog, is a desirable power, and well worth attention. On this subject the following extract from an eloquent inaugural address, delivered a dozen years ago by Mr. Jabez Hughes at the opening of a photographic society at Glasgow, will interest our readers, as illustrating the prescient estimate of the importance of this subject Mr. Hughes held so long ago. The extract also contains interesting suggestions on other subjects recently brought under general attention:—

> Optics and mechanics may assist in supplying more perfect lenses and apparatus, but I cannot help thinking that it is to chemistry we must mainly look for our assistance. There is one branch in particular to which I wish to direct the attention of those of our chemical friends who are disposed to experiment in this new field; it is to the examination of those singular and complex forms of organic chemistry, so easily disturbed in their proportions, and from which, when enlisted into the service of photography, we have everything to hope for. In the most sensitive process we know—collodion—organic chemistry plays the most important part. Cotton, ether, alcohol, acetic acid, these are the organic agents that cause that tremblingly sensitive condition in the silver salt that the least ray of light disturbs. Again, are we to suppose that better developing means may not be discovered than pyrogallic acid or protosulphate of iron, valuable though they be? Professor Hunt assures us that the instant light strikes on any object it leaves its impression: then why is it we allow it to remain so long in the camera? It is because we have not yet discovered that substance which will develop this momentary change, and we have to leave it in the camera sufficiently long to suit the character of our developing

means. It appears to me that sensitiveness depends as much on the developing agent as on the base changed; and great as has been the advances made, proud as we may justly be of our present productions, let us never forget what yet remains to be done. Photographic science is far in advance of photographic art. Our camera offers us a picture which, as yet, we can only partly take—we open our eye, and the picture is instantly on the retina. Let us call our lens an artificial eye, then our sensitive surface ought to be an artificial retina. Light instantaneously supplies and optics as quickly delineates the image, but chemistry hesitates and bungles, and when at last she catches it, its life is gone; the body is there, and it's a beautiful corpse, but oh! it wants the vital spirit; the street is there, but there are no men in it; the landscape, but no atmosphere; the old castle, but no sky; there is the stream, but it's frozen; there the group of figures, but petrified; here are the beautiful features, but where's the expression? I look deeply into the eyes, but the soul has fled. A cottage, trees, and a bit of foreground do not make a landscape; crumbling ruins, though ever so beautifully rendered, are not a castle; and the human figure, stiff and galvanized, though he stare me out of countenance, is not a man. There is a something yet wanting, and that is the *breath of life*.

I wish to avoid misconstruction on this head; I wish to be understood to say that a perfect picture can never be obtained until we can get on our sensitive surface all that the lens gives us, all that we see on the ground glass. Let us point a camera to a busy scene in one of our cities, and what do we see on the ground glass? There are the fleeting clouds in the sky, the atmosphere all around investing all the objects with the special character of the day, and giving that peculiar appearance which we are so happy to see successfully imitated in paintings; the figures are lively and animated, and we should be in ecstacies could we get all this on our pictures. But nothing short of an instantaneous process can secure all this; therefore I say that, as these parts of the picture we cannot catch form so large a proportion of its beauty, although the part that we do get be most transcendently lovely, yet we should never feel satisfied until we are enabled to get the other also. I think this is a sort of standard to aim at—a picture such as we see on the ground glass.

We have all noticed the dispute in London in relation to the treatment of photographic subjects. Sir William Newton, with the eye and feeling of an artist, yearns for these effects; and thus he proposes to obtain ærial softness in his picture by putting the lens a little out of focus; and, to increase the illusion, he advocates the putting in artificial clouds in the negatives, with a view of adding more warmth and life and nature to the picture. But these are but sorry means of accomplishing the object. The first, last, greatest beauty of the photograph is its truth. There is no room in photography for artifice or trickery; it is too noble a subject to be treated meretriciously. Deficient though it be in many respects—and we will acknowledge and deplore those deficiencies, and do our utmost to improve our art—but we will earnestly protest against the introduction of artificial clouds or anything which derogates from its truth.

Tinsel and blue fire have no affinity with our art. Though it certainly has not reached its full proportions, yet photography can stand, and is only deformed by crutches. The deficiencies of photography arise, not from its imperfection, but from its immaturity; we *have* half of our picture, and it is a noble half, and we will be content until, in due time, it expands and develops itself to its full proportions.

But these requirements—that is, the introduction of what I may call the spiritual part—*must* be supplied before a perfect photographic picture can be obtained, and I cannot help thinking that we are not so far from arriving at this much desired result. All that we want is a material so sensitive that, with an instantaneous exposure, it will give us a clear and strong picture of *all* that is on the ground glass.

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PREPARING LAC VARNISHES.

Some interesting communications of the bleaching of shellac, and on its various solvents, have recently appeared in our excellent contemporary, the *Scientific American*. It appears that the solvent used by hatters for shellac in making a waterproof varnish for the body of silk hats is a saturated solution of borax. The following communication gives some valuable information on the mode of bleaching it, and in regard to solvents:—

"For one pound of good shellac take four ounces of crystallized carbonate of soda, and one gallon and a half of water; put the whole in a clean iron or copper vessel of double the capacity, and, under constant stirring, bring it to boiling over a slow fire. The shellac will dissolve, and, if it it is intended to make colourless French polish, the solution has to be run through a woollen cloth. For brown bookbinder's varnish, or a colourless varnish for maps, photographs, etc., the solution has to boil for about an hour longer, but only simmering, and then to cool very slowly without stirring; better let it stand over night, and let the fire go out under it. In the morning you will find a wax-like substance on the surface of the solution, and the other impurities of the shellac as a deposit on the bottom of the vessel. The solution is likewise to be run through a woollen cloth, and then to be filtered. For the filter, I take a small wooden keg, remove the top and bottom, and fasten to one side a piece of muslin; on the muslin I bring about four inches of fine washed sand, and on top of the sand a layer of clean straw; then I pour the solution into the filter, and let it run through. Should the first portion run through not be perfectly clear, like red French wine, it has to be brought back to the filter. When nothing will run through any more, pour some clean water on the filter, to wash the remaining solution out. If you intend to make a transparent brown varnish—bookbinder's varnish—this filtered solution has to be precipitated with diluted sulphuric acid (one part acid to twenty parts of water), the precipitate collected on a coarse muslin cloth, and washed out with cold clear water till it runs through without taste. Then fill a stone or wooden vessel with boiling water, and throw the precipitate in it; it will directly soften and stick together; this half mass has to be kneaded in the hands, doubled up, melted, and drawn out till it assumes a fine silky lustre, then drawn out to the desired thickness in sticks, like candy, and it is then ready for solution.

"To make white French polish, or transparent colourless varnish for maps, the solution has to be bleached. The bleaching fluid is made as follows, and the proportions are, for one pound of shellac take one pound of good English chloride of lime, dissolve it in fourteen pounds of cold water, triturating the lumps well; let it subside, and decant the clear fluid; add seven pounds of water to the residue, and, when subsided, add the clear liquor to the other: precipitate this liquor with a solution of carbonate of soda, let the carbonate of lime settle, and decant the clear chloride of soda; wash the sediment out with water, and add the clear liquid to the former; put it in a high stone jar, and give it a rotary motion with a wooden stick, pouring in at the same time very diluted sulphuric acid, till it assumes a greenish colour, and a smell of chlorine is perceptible. Then add of this liquid to the solution to be bleached, under constant stirring, till all the colour is gone. French polish will look like milk, colourless varnish like whey, but more transparent. Then precipitate with dilute sulphuric acid, exactly as the solution for bookbinder's varnish, and treat the precipitate in the same manner, in hot water. All iron must be carefully avoided as soon as the chlorine liquor is added.

"To make the different varnishes, it is only necessary to dissolve the different precipitates in alcohol. For bookbinder's varnish take one part to two and a half parts alcohol; French polish, one to three; colourless varnish, one to two and a half, and add to the varnishes (not to the polish) one and a half drachms of oil of lavender for one pint. For photographs this solution is too strong; one part of bleached shellac to six parts of alcohol will answer. For maps the solution should not be applied immediately to the paper, but the latter should first receive a coat of boiled and strained starch.

"By dissolving shellac, either in a solution of borax or in one of an alkali, shellac acts as an acid—like most other resins, or like stearic or margaritic acid, contained in the fats—combining with alkali, and forming a kind of soap, easily decomposed by any of the common acids. The waxy matter, not saponifiable, is by slow boiling separated, and, lighter than the solution, swims on the surface, where, after cooling, it can be collected. It is harder than common wax, made into candles it burns like wax, and resembles the vegetable wax of commerce.

"It is a remarkable fact that all shellac contains a small quantity of arsenic in the form of yellow sulphuret; it is found in the residuum, after the solution has cooled, and is decanted off in small golden yellow particles, and out of a solution of ten or more pounds enough can be picked out to reduce it to metallic arsenic. Gustavus A. Schmidt."

Swatara, Pa., Jan. 13, 1866.

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THE SISTER ARTS.

BY REV. H. J. MORTON, D.D.*

We observe with much surprise that a sharp contest is going on abroad between the advocates of Painting on the one hand, and of Photography on the other. The two pursuits are regarded as *antagonistic*, and sharp things are said by the friends of each concerning the claims of the opposing art. To us it seems obvious that photography is the handmaid of painting; while to painting, or rather to the special skill, taste, and genius of the painter, the art of photography must look for all the improvements which are not simply scientific or mechanical. As well say that *printing* is antagonistic to *writing* as that photography is antagonistic to painting. When the press began to pour forth its torrent of repetitions of the same volume, no doubt the work of the scribe and copyist was greatly abridged. But still men wrote, and even now write as much or even more than ever, and the profession of the scribe is anything but obsolete. So of painting and photography. The vast improvements made in the latter art; its fidelity and amazing facility of rapid reproduction, have multiplied landscapes and portraits beyond all calculation. Ten thousand men, women, and children have their likenesses taken by photography, where one had a portrait painted in olden times; and a myriad of country seats, and buildings, and rural scenes are produced by the photographer, which the painter would never have been called upon to put on canvas. But still, artists of ability in each department thrive, and historical painters, and landscape painters, and marine painters, and even portrait painters, find abundant employment. The "Niagara" of Church is not less valued, because there are a thousand views of the "Falls" to be had in every city! A Moran, a Lewis, a Hamilton, or a Richards is quite as highly prized as if sea-pieces and landscapes were not to be purchased in the store of the photographic printseller; and though portrait and miniature painting have been affected by the introduction of photography, still any artist of real ability in these branches will find his easel always supporting a canvas, and his chair always occupied by a sitter. Our annual exhibitions show no diminution of well-executed paintings. Our public sales show no reduction in prices paid for the products of the brush; and thus, looking at the evidence furnished us by facts, we say that the two arts are not antagonistic. It would be strange, indeed, if they were. The one creates, the other copies. The one calls for the exercise of imagination, the other is content with the results of taste and skill. In a good portrait, in a good landscape, much more in a good historical piece, there is the exercise of imagination. The face is not the face which everybody sees, but which the painter sees and enables others to recognize. The same scene in nature, be it mountain pass or pleasant plain, however faithfully rendered, will, if painted by two artists of original genius, present totally different aspects. There are pictures of Turner and Stanfield of the same locality taken from exactly the same point, yet they are very unlike! You recognize the scene at a glance, but in one picture the lights are so arranged, and the detail so treated, that it seems another landscape. Now, photography does not attempt anything of this kind. It does not deal with fancies, but with facts. It cannot modify. It obeys the lens, not the eye. It can copy with an accuracy which the hand would in vain attempt to imitate, but it must submit to the iron law of "things as they are," without liberty of alteration. But though travelling along different roads, with different aims, and under different influences, the two arts come together and mutually aid each other. The studies of feature, form, and foliage, of rock masses and richly sculptured architecture and projected shadow, made by the photographer, are invaluable to the painter. Step into the studio of any artist. Here is one occupied by a painter whose groupings of cattle and representations of raids, full of men and horses, have established for him a reputation which is enviable. All around his walls you will see *casts* of living cows and dead guerillas; studies in colour of goats, and dogs, and donkeys, and dappled steeds, but beside them fine photographs of the same or similar subjects; and he will tell you that these last are of great use to him. He cannot keep a cow in his closet to consult, when the shape of a horn or the moulding of muscle is in question. Nor can he conveniently accommodate a goat, and donkey, and flock of ducks in his studio, but he can have scores of photographs which give everything of the donkey except his bray, all of the goat except his pungent aroma, and all of the ducks except their noisy gabblings. Pass into this room of another artist. He has made a name of note by his exquisite delineation of natural scenery. His walls, too, are full of studies in colour made by his own hand on still summer-days, and by calm flowing rivers. They show many hours of patient toil. But here, too, are plenty of Moran's matchless photographic "bits" of wood and water, of rock and foliage, made in an instant by the unerring lens; and again the artist will tell you they afford him most valuable assistance. So of painting in other departments of the art. Now, on the other hand, the painter's eye for form, and grouping, and composition generally, is essential to the photographer, if he expects to produce works of high merit; and the study of good paintings, and of the rules by which they are produced, will be his best help towards executing good photographs; I mean, of course, not merely mechanically good, but artistically excellent. Colour is another element which at present must make painting and photography distinct and yet co-operative arts. If the photographer wishes to impart in the highest degree the charm of colour to his prints, he must resort to the painter. The painter, if he wishes to secure a rapid and perfect picture on which to exercise his skill as a colourist, must depend upon the photographer. In examining lately some of the finished porcelain portraits from the establishment of Messrs. Cremer and Dillon, in Eighth Street, and from Messrs. Wenderoth, Taylor, and Brown, Chestnut Street, we were struck with the exceeding beauty which resulted from the combined skill of the painter and accuracy of the photographer. The most accomplished artist in ivory could hardly equal the results secured by the help of a photographic picture on which to work; certainly not with anything like the same accuracy and the same rapidity; while, of course, the photographer, without the artist's skill, will fail to group or pose his figures properly, and lose all effects, so magical, of flesh-tints and tones of colour in hair and eyes, and all accessories. The two arts are not antagonistic, but co-operative. We hope their respective votaries will realize this fact, and work together harmoniously and with mutual encouragement.

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TO REDUCE AN OVER-DEVELOPED NEGATIVE.*

Very often it occurs that negatives are over-developed to such an extent as to render them almost useless. By the following simple process they can be reduced and made to print well. First, remove the varnish by alcohol, and wash them well. Then put them in a pan with one pint of water and two drops of acid pernitrate of mercury, and then develop over again. Then dry and varnish as before.

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* *Philadelphia Photographer.*

* *Philadelphia Photographer.*

The pernitrate works slowly, and should be watched until the negative is thought to be all right.

To make pernitrate of mercury, take of

Mercury	3 ounces troy
Nitric acid	5 „ „
Distilled water	6 drachms.

Dissolve the mercury with the aid of gentle heat in the acid, previously mixed with the distilled water. When reddish vapours cease to rise, evaporate the liquid to seven troy ounces and a half, and keep it in a well-stoppered bottle.

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ANOTHER EXPERIMENT ON THE LATENT IMAGE. *

A month ago I took a view upon a 7 by 9 plate which, after development with the collo-developer, I treated with a weak solution of acid pernitrate of mercury. The usual phenomena were exhibited; the image was first slowly dissolved off, leaving only the coating of bromide and iodide of silver; this in a few minutes more began to be attacked, and when about half gone, a faint positive of the view reappeared in the film, which itself soon gave way to the increasing transparency, and at last nothing but the glass and the perfectly transparent film remained.

I washed this thoroughly, first with distilled water, then with filtered rain-water for fifteen or twenty minutes under the tap, and then rinsed with distilled water again; and then, with a clean wooden spatula, scraped the film off the glass into a clean porcelain crucible, and placed it over a Bunsen burner. After slowly drying the film, I raised the heat gradually to redness; portions of the film, as the heat increased, flashed slowly off like wet gunpowder, and at last it was completely consumed, leaving *no ash whatever behind;* a slight yellowish stain, about a quarter inch long, and a sixteenth wide, alone remained. This stain I treated with chlorine water, without producing any change in its colour, and next with ammonia and various acids successively, but without any visible effect whatsoever.

Thinking that this experiment indicated very strongly that no salt of silver remained behind, after subjecting the film as described to the solvent action of the acid pernitrate of mercury, I communicated the above to Mr. M. Carey Lea, and at his suggestion tried this further experiment.

I coated, exposed, and developed successively seven 7 by 9 plates with the same bromo-iodized collodion, and, avoiding purposely the collo-developer, used a plain iron developer, the same for each; placed them successively (after thorough washing in distilled water) in the same bath of acid pernitrate, and dissolved out each image to perfect transparency (the same phenomena being exhibited as narrated above), and then washed each as carefully as before. On one of the transparent films I then redeveloped the image with nitrate of silver solution and the same iron developer, in great perfection, with one application only of the nitrate and developer. This I did, in order to be assured that the collodion I used was capable of yielding a film susceptible of redevelopment after being exposed to the pernitrate.

The remaining six films I scraped off with care into a beaker, and added about an ounce and half of distilled water and a small bit of pure zinc. I then added pure dilute sulphuric acid, and kept up the action for a week, by adding a few drops additional, from time to time, until the zinc was wholly dissolved.

At the end of this time I added 20 drops of pure nitric acid, and gradually raised the heat to boiling. No change in the appearance of the liquid or films took place under the above treatment.

I now filtered off about four drachms of the liquid diluted slightly, and added to this two drops of dilute hydrochloric acid: not the slightest cloud or opalescence was formed, or change whatsoever. I then repeated this experiment, after slowly evaporating the liquid to about a quarter of its original bulk, but without any effect of any sort. The transparency of the liquid continued *perfect*.

So far as this mode of investigation will indicate, it is therefore evident that no silver salt was present in a half dozen 7 by 9 films, on each of which an image could be redeveloped after its treatment to perfect transparency by the acid pernitrate of mercury; and this experiment also confirms the first.

Now, here is the film, apparently reduced to pure pyroxyline, and apparently deprived of all substances capable of exercising any chemical action on the silver and iron developer whatever, and yet to it has been conveyed a power to cause the particles of silver, as they fall from the developer, to assume the form of the picture to which it has been exposed in the camera. What is this power? It is a persistent power, for the transparent film on which it is impressed may be dried, and the image be redeveloped the next day by the usual mode of developing tannin plates.

It is to be observed that these experiments give only *negative* results. They must therefore be repeated many times, and with every variety of circumstance, and by different observers, and with the same results, in order to produce a high degree of conviction.

Providence, January 14, 1866. S.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, March 27th, 1866.

I would fain have to communicate, if not some important discovery, at least some new process, but I am reduced to the necessity of again referring to the Universal Exhibition of 1867, for that is the subject which now entirely absorbs the attention of all our photographers. The agitation which the contract granted to M. Pierre Petit by the Imperial Commission has produced among Parisian operators is such that even the political journals have alluded to it. In fact, the malcontents have not been content with merely meeting to discuss the matter—they have communicated their grievances to the public through the press. About forty of them protest against the decision taken by the Commission. I need hardly say that all this fuss will have no other result than to give still greater notoriety to M. Pierre Petit.

The Commission could not have acted otherwise than it has, for several very simple reasons. In the first place, all the industrial undertakings connected with the approaching exhibition have been awarded after public competition, and more than the others, photography required to be submitted to that measure—firstly, because free rivalry would have led to confusion and disorder; and, secondly, because the Administration wished to impose on the contracting photographer certain conditions of good execution and price which should offer serious guarantees to exhibitors with regard to the reproduction of the articles exhibited.

The contract was offered for competition by sealed tenders. Many photographers sent in their terms; among them, Messrs. Bingham, Pierson, Liebert, Ladrey, and Ludovic Durand; and the most curious feature of the affair is, that among those who tendered for the absolute monopoly of reproduction and portrait taking, are those who now energetically protest against the *partial* concession made to M. Petit. They would have found the monopoly all right if they had secured it, but I do not know whether they would have accepted the very onerous conditions imposed on their brother artist. Besides the 60,000 francs paid by Pierre Petit, and the expenditure necessary for erecting his *atelier*, he has engaged to make a reduction in favour of exhibitors amounting to 25 per cent on the ordinary prices: moreover, to take gratuitously the portraits of all the persons employed in the Exhibition, which will be pasted on the tickets of admission delivered gratis by the Administration. The number of these portraits will probably amount to between 20,000 and 30,000. I say nothing of the control to which all his proofs will be submitted, so that the Commission may reject such as are imperfect.

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* *Philadelphia Photographer*.

Instead of useless protests, the photographers would have done better to make arrangements with the contractor, who has an interest in dividing his vast undertaking among all the specialities. By offering to Pierre Petit a reasonable royalty as a guarantee, and a per centage on their profits (which is only fair), each of them would have obtained a share in this important undertaking, and thereby have gained both emolument and honour, as they would have been able to put their own names on their productions.

In presence of the hostility of his Parisian brethren, the contractor will very probably decide on accepting only foreign partners, who, with greater judgment, have already made him offers.

With regard to the *International Atelier*, against which, of course, no protest has been made, I must say a few words in reply to the applications I have received (thanks to your kind intervention) from several English photographers.

The ground granted to me by the Imperial Commission is most favourably situated near the principal entrance of the Exhibition, with a north-east aspect. The buildings will form an elegant and ornamental whole, consisting of eight or ten detached pavilions, half for French and half for foreigners. Each pavilion will have two stories, with a frontage of about 30 by 36 feet in depth. On the ground-floor will be a large exhibition room, with waiting and dressing rooms; on the first floor a glazed terrace, about 12 feet by 24, with laboratories, dark closets, &c.

From the proposals already addressed to me, I can foresee that there will be (besides clever portraitists who will bring their speciality, enlargements, portraits obtained by peculiar processes, &c.) ateliers for the production and sale of stereoscopic proofs, for albumenizing paper, photographic printing offices, &c., &c. As soon as the general plan shall have been definitively adopted, I will publish a drawing of it. As to the internal arrangements, they will be made in concert with the occupiers, and according to the requirements of the particular branch they may intend to practise. I should be much obliged if all future applicants would give a precise statement of the nature of the business to which they would wish to devote the pavilion they might obtain.

M. Niepce de St. Victor has this week shown me a series of heliochromic proofs on silver plates, obtained by means of the same transparent paintings which M. Poitevin has employed. All the colours are reproduced most vividly, and I can assure you that these figures are in no way inferior to those executed on paper with violet sub-chloride of silver.

Ernest Lacan.

MR. CHERRILL'S THEORY OF DEVELOPMENT.

Sir,—In your paper of the 23rd of March, Mr. Johnson urges what he calls his objections to my formula for development with salts of iron.

His remarks are in substance those which I have already answered. I shall, therefore, only ask Mr. Johnson how, on the ground of his objection, he would propose to account for the following decomposition:—

$$NO_4 + 2\,SO_2 + 2\,HO = NO_2 + 2\,(HO\,SO_3),$$

where the NO_4 gives up two equivalents of oxygen, and becomes NO_2, which, in its turn, will be again oxidized, and become NO_4?

I gave this equation as an answer to the *British Journal*, who had the ingenuity to apply it to the wrong argument. As Mr. Johnson has only put forward one argument, here is not much fear of his making this blunder; though it seems he must have failed to see its application to the point under consideration.—Yours truly,

Nelson K. Cherrill.

Belmont Lodge, Lee, S.E.

ART EDUCATION FOR PHOTOGRAPHERS.

Sir,—I am glad to see the subject of Art Education for Photographers becoming an important feature in your columns, as I think it must be admitted to be the one thing wanted by the great bulk of photographers. The art of photography (as a process) has now arrived at that state of perfection which leaves little or nothing to be desired; but beautiful as the art most assuredly is, it becomes doubly so when artistic pose and lighting lend their aids; whilst, on the contrary, to the cultivated mind the absence of these qualities can never be entirely replaced by mere manipulative excellence. It is true that we have a few "bright particular stars" in the photographic firmament, but the myriad of these children of the sun have no guiding rules, and, like their prototype, Phæthon, their career is erratic. I heartily endorse the remarks made in a recent issue of the Photographic News, with respect to a part of Art being unteachable, but at the same time there are certain simple rules on which all good Art is based, and which are easy of acquirement, although requiring some practice in their application. These are admirably laid down in Harding's "Principles of Art," but as this work is expensive and somewhat copious in matter, I will endeavour to give you a few of the leading points for the benefit of photographers generally. Nature is composed of an infinite variety of curved lines; the more varied will necessarily be the more beautiful; it consequently follows that a curve should never be repeated in the same picture, but each curve should differ in length and direction of curve, and the spaces defined by these curves should each represent different surfacial quantities.

In these few simple rules lies the germ of the beautiful, and all great works of art will bear out these dicta, whilst, on the contrary, all bad Art will be found to violate one or other of these laws. I may cite one or two examples to confirm these propositions. If any of your readers will take the trouble to walk through the "Turner Gallery," in the works of this, the greatest genius of modern art, these principles are fully exemplified; and if proof be wanting that even genius *without* these governing principles may fall into worse than blunder, I need but point to his "Napoleon at St. Helena." A worse specimen of Art never disgraced a country ale-house sign. Bad, without a single redeeming point, it is almost impossible to reconcile this picture with any other idea than that it was painted by Turner as a satire upon his less gifted compeers; if such was really the object, no better example could be found to point an error. It is repetition repeated. As probably many of your readers may not have seen the picture, I enclose a sketch* (from memory), and will point out its chief defect. The figure is a front face, and the outline repeats itself on either side from head to foot; these are again repeated in the water below, so that the principal and almost only curve in the picture is repeated four times, and the dress, arms folded, boots, &c., all keep up the monotone idea.

It must also be accepted as a rule that there is no absolutely straight line in nature; probably the nearest approach to this is the sea-line or the horizon; but this is so nearly indefinable that it does not violate the rule.

As a few remarks on cases practically before me† will probably do more to familiarise these principles to the mind than any amount of reiteration, I will proceed at once to give a few examples by which the application of these rules will be the better understood, addressing myself more especially, in the first instance, to portraiture.

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* Most readers will remember the picture in question, either in the original or in engravings. It is, we believe, in the national collection, but is not at present hung in the Turner room, for want of space.—Ed.

† Examples are enclosed to us, but we cannot well do the subject justice with wood engravings.—Ed.

It is not an uncommon thing to see a figure posed with the whole body presenting the full front, with the head in the same line, the background and accessories all carrying out the same formality. The lines here are as nearly as possible repeated on either of the figures, the arms and legs being a repetition of quantities. The top of the table falling in a line with the wainscot carries a straight line through the picture, parallel, too, with the cut margin of the picture; these again occur on the slip. As a contrast to this, I find another card, the same pose being given; but in which, by changing the point of view, the irregular curves are at once obtained: by a few trifling accessories—the books and stool partly draped—the formality is broken.

In another common-place pose before me, the same faults are glaringly prominent—chair and stand both placed on the same base-line, and the same height. By a little arrangement these defects are removed. In another card the chair cutting away the repeated line gives us an irregular pyramid—one of Nature's most beautiful forms. The few accessories give additional interest to the picture; but these should be in keeping with the subject, and not too large nor too many. It should be noted that the larger accessories should never be seen in their entirety, but always partly concealed, simply because there are few objects (articles of furniture more especially) but have a repetition or formality of line. I must not omit to mention also, that neither figure nor object should occupy the exact centre of the picture; the deviation need but be slight, but deviate it must.

Quasimodo.

PHOTOGRAPHY ON CANVAS.

Sir,—I read with interest the article headed "Photography on Canvas," in your Journal of the 16th inst. I have myself experimented in that direction, and some years ago obtained perfectly successful prints on canvas prepared in the usual manner for painting upon in oil colours, and using only the ordinary silver printing process. I found that by washing the surface of the lead priming with alcohol and water, the slight greasiness of the surface was removed without affecting its hardness, and that I could then salt and silver it like paper by floating, if I added a few drops of alcohol to each of the solutions before using. I washed and fixed the prints in the usual manner—endeavouring, however, to keep the threads of the canvas (at the back) as dry as possible. After mounting upon a stretcher, they were ready to paint upon without further preparation. I have myself coloured photographs in oil, some of my earliest efforts being made seven or eight years ago, and I fully agree with "The Photographers' Assistant," that cracking would be the probable result of having any medium, such as gelatine or collodion, between the surfaces of the paint and the canvas. I also agree with him that the permanency of the print is a most important element in any process; but, unfortunately for silver printing processes, there can be no denying that the subsequent colouring in oil, either on paper, panel, or canvas, produces a result only partly permanent—that is, where the colour is laid on sufficiently thick to hide the ground; for I know from experience that the thinner glazings (such as the shadows about the eyes and other features, which, for the sake of quickness and correctness of work, the colourist does not cover with *opaque* paint) all change; whether it is the silver or the paint which alters I do not pretend to say, but I incline to the opinion that it is "a little of both."

Feeling the importance of this matter, I wrote some time ago to Mr. Pouncy, of Dorchester, to ask if he could transfer to canvas one of his *carbon* prints; and the result is, that at the present moment I have on my easel a photograph *printed in oil paint* upon canvas.

The colour I selected was a mixture of Indian red and raw umber, being the same tint which I employ for the sketching in of a head from life, and the result is most satisfactory, either for finishing in oil or for keeping as a plain print. It must be permanent, if oil-paint is permanent; and it is certainly a most interesting fact to artists, that we can now obtain by photography a perfect lay-in in any colour of a portrait in the very materials which we should employ in ordinary portrait painting.—I am, sir, your very obedient servant,

An Exhibitor at the Royal Academy.

London, March 17th, 1866.

P.S.—I open this to say that I have just received from Mr. Pouncy another photograph on canvas, printed in oil colours, of the same tint as an ordinary silver print, inclining to purple, and the effect is quite that of an impression on enamelled paper, due in this case, I understand, to a coating of white lead, in addition to the ordinary priming, before printing upon.

[The transfer of carbon prints to canvas appears in many respects to furnish a satisfactory permanent process as a basis for oil painting. The only question which will arise is, as to the nature of the transferring vehicle, so as to possess assurance that it will not crack or in any way prove a source of instability. This might, we doubt not, be easily made certain. The transfer method of finishing carbon prints appears to be the most desirable and successful method. All Mr. Swan's prints are now finished by transfer to a mounting board. They might also be transferred to canvas; but it should be with some other adhesive material than gelatine.—Ed.]

Talk in the Studio.

A Photographic Mystery Slightly Ventilated.—A Correspondent sends us the following:—"It is just possible that many proceeding along the great highway of the great metropolis, and observing the immense quantities of cheap common card pictures in the windows, may say to themselves, What on earth becomes of all these things? Now, if the same mental enquirer will take up some of the 'far off' provincial newspapers, after a short search he will find the following:—

> Your future husband or wife's true carte-de-visite.——The celebrated French astrologer will send the true C. D. V. of your intended, with age and date of marriage, for 16 stamps; three questions answered for 2s. 6d. State age and sex. Send stamped directed envelope to ——, Greek Street, Soho, London.

"By this it is evident that the principal use made of the worthless pictures alluded to, is to assist the 'astrologer' in carrying out his unlawful swindling practices; and the sooner the 'Greek Street impostor' is introduced to the notice of the Bow Street magistrate, to answer a few of his questions, the better." It appears that surplus or waste stock of any kind of portrait is used up in this way. We have heard of one case where an applicant received the portrait of a well-known actor who has a wife and family already, as the portrait of her "future husband."

Hydrocyan-Rosaniline.—Under this name, a new organic base has been lately described by Dr. Hugo Müller, who prepared it by acting with cyanide of potassium upon the well-known Magenta crystals. When thrown down by the addition of an alkali to any of its salts, the base in question takes the form of a white curdy precipitate, which presents a striking resemblance to chloride of silver. In the dark it remains unaltered, but on exposure to sunshine it quickly assumes a superficial rosy colouration, a fact which again suggests a remarkable similarity to chloride of silver, and suggests the possibility of applying it to some printing purposes.

Natural Backgrounds.—A correspondent, Mr. Herbert, of Banbury, sends us some cards to illustrate how natural scenery may be introduced into backgrounds. He uses a white side slip, and, by double printing, introduces a piece of natural scenery from a second negative, a series of suitable subjects being secured for the purpose. This, well done, will often be pleasing; but the danger to be avoided is, the introduction of subjects in which the objects, being minute in scale, indicate distance, but, by their sharpness, and the absence of aerial perspective, suggest immediate proximity.

Peroxide of Hydrogen.—Peroxide of hydrogen is a compound of hydrogen and oxygen, and containing just twice the proportion of the latter element that water contains. As it is a very unstable compound, readily giving off its second equivalent of oxygen, it would be of considerable use in some of the arts, as an oxygenant, if it could be obtained tolerably cheaply. Hitherto it has been produced only by the aid of peroxide of barium, and the process of producing it has been at once costly and exceedingly tedious. When peroxide of barium is added to a dilute solution of hydrochloric acid, kept cool by the vessels containing it being surrounded by a freezing mixture, the barium of the peroxide unites with the chlorine of the hydrochloric acid to form chloride of barium, one of its two equivalents of oxygen combines with the hydrogen of the hydrochloric acid to form water, and the other equivalent of oxygen combines either with the water thus formed, or with an equivalent of the water originally present, forming therewith peroxide of hydrogen. To obtain by means of peroxide of barium, however, an at all strong solution of peroxide of hydrogen, after neutralizing with peroxide of barium a dilute solution of hydrochloric acid, the barium must be precipitated from the resulting chloride of barium by means of sulphuric acid, added drop by drop until slightly in excess; the precipitate of sulphate of barium must be separated by filtration, more peroxide of barium must then be added to the filtrate, the barium of the fresh portion of chloride of barium thereupon formed must be precipitated and separated as before, and these successive operations must be repeated very many times—the hydrochloric acid used being finally separated by means of sulphate of silver, and the sulphuric acid by means of caustic baryta. Hofmann has just found that a strong solution of peroxide of hydrogen may be obtained by a much simpler method than this, if peroxide of potassium be used instead of peroxide of barium. This method, indeed, involves only a single operation, consisting simply in adding peroxide of potassium—formed by directing a current of air, by means of a bellows, on to metallic potassium in a state of fusion—to a somewhat concentrated solution of fluosilicic acid. Silicofluoride of potassium, which precipitates, and a strong solution of peroxide of hydrogen, are the results. This process is very simple, but unfortunately its involving the use of metallic potassium cannot but prevent it from yielding peroxide of hydrogen cheaply enough for use in the arts.—*Scientific American.*

The Specific Gravity of Alcohol.—A Russian chemist, M. Mendelejeff, has just published the results of a series of very laborious researches with respect to the specific gravity of absolute alcohol, and of the various compounds of alcohol with water. Curiously enough, these results go to show that of all previous determinations of the specific gravity of alcohol and its hydrates, the oldest being those made by Gilpin, in 1794, are the most accurate. M. Mendelejeff's experiments far transcend in accuracy all previous ones upon the same subject, their author having taken into account every possible source of error, and having bestowed the utmost pains upon ascertaining the magnitude of each. They show that at the zero of the Centigrade scale the specific gravity of absolute alcohol is 0·80625, at 5 deg. 0·8027, at 10 deg. 0·79788, at 15 deg. 0·79367, at 20 deg. 0·78945, at 25 deg. 0·78322, and at 30 deg. 0·78096.—*Scientific American.*

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To Correspondents.

J. Banks.—Various varnishes may be used; but perhaps none are better than the usual mastic varnish, if you can allow a few days, to dry perfectly. A spirit varnish can be dried at once by gentle heat; but for application to paper it should have a good body. The "penetrating varnish" of Newman, or a varnish prepared for the purpose by M. Mansion, and sold by Mr. Solomon, answers well. 2. Shortly, we believe; but we have no certain information. 3. If wrinkling take place in the print whilst in the printing frame, it arises from damp; the paper was either slightly damp when placed in the frame, or, if dry then, has become damp afterwards, in which case, as it expands, it must wrinkle. 4. A low gas light, not too near the print, will not injure it whilst developing. 5. The best mode of mounting developed prints for colouring depends much on circumstances. Some painters prefer to work on a print mounted on canvas, others prefer them mounted on a stout board.

W. G. G.—The glass appears excellent for the purpose. For enlargements, the triple is the most suitable lens. If the transparencies are to be the size of the original negative, your stereo lens, used with small aperture, will answer well. 2. We generally work with the lens in its usual position; the front towards the transparency.

J. H. Redin.—Thanks. The case is most extraordinary.

Landscape.—Of those you name, the first will give decidedly the best results, and work most rapidly.

Amateur.—We have not had much practical experience with the chromatype process, and as it is a less perfect process than those in use, we should scarcely recommend the expenditure of much time upon it. Mr. Hunt, the originator, describes one or two methods of varying the tone from red. He states that if the completed print be placed for a few moments in a weak solution of common salt and water, the picture is apparently obliterated; but on exposure to sunshine for a quarter of an hour, it reappears of a lilac tint. He also describes a method of obtaining a brown tone. Mr. Hunt, speaking of chromatypes generally, states that they change in the dark, the picture being eventually obliterated beneath a dark film of metallic silver. Wherever silver is used, simple washing is insufficient to fix the picture. Using a uranium salt, instead of the chromate, will give a fine black when developed with nitrate of silver.

Bendigo.—Rub the glass with a thin solution of wax in ether before coating with collodion: the collodion you mention will answer. 2. We will ascertain the price, and state in our next. 3. We do not know much of the lens you name; the maker is a pretty good one, but not nearly so good as the best English makers. We should not think it could be altered with advantage.

Phantom.—It is probable that the transparencies to which you refer, as being nearly black on both sides, are albumen, and not collodion. Perhaps the best method of securing a black tone in collodion transparencies consists in first treating them with bichloride of mercury, followed by either a very dilute solution of hyposulphite of soda or of hydrosulphate of ammonia. Long immersion in a dilute solution of sulphide of ammonium will produce a black which penetrates right through the film.

James Brown (New Zealand).—The negative has not yet arrived.

Typo.—We should prefer a window in the south ridge, but would glaze it with corrugated glass, to prevent the admission of direct sunshine. We should on no account dispense with side light at the north side. 2. The spot to which you refer appears to arise from a defect in the paper.

Injustice.—It appears to be a paltry advantage to take on the part of the employer; but it is not worth quarrelling about. Our terms for advertising for such announcements are 5 lines (60 words), 3s.

B. W. A.—The sensitive silver salt penetrates not only the albumen, but the body of the paper, to a greater or less degree, and wherever it exists the hypo must penetrate, in order to fix the picture. But whether the silver salt penetrated there or not, the hypo would always penetrate the whole of the paper, albumen as well. One of the sources of fading consists in the fact that the albumen forms a compound with the silver in the process of sensitizing, which is not dissolved by the hypo, and remains in the whites of the finished prints. This compound always changes colour in time. No such compound is formed in the collodio-chloride process, and for this reason it gives promise of greater permanency than prints on albumenized paper.

G. Y.—The imperfectly toned print appears to be produced from a weak negative, and it is almost impossible to get a good toned print from a poor negative. 2. In the print enclosed, which is half dissolved, the image appears to have been formed in the gelatine film, which, being soluble, begins to disappear as soon as it is immersed in the toning bath. We have seen several such results in attempting to use gelatino-chloride of silver.

Kent.—In order to avoid air bubbles in enamelling, let the print be sufficiently wet that a small wave is driven from between the two surfaces as the print is pressed down. To avoid the loss of surface in mounting, use glue instead of starch or similar paste. Any adhesive material the moisture from which penetrates the print has a tendency to mar the surface. We have not practised the method very largely ourselves, but have been generally successful. We will consult some friends who have practised the plan considerably and successfully, and ascertain if any additional hints can be given. If you would like to enamel after mounting, the best plan would be to leave no margin; the edge of the print and of the card being flush. This for vignettes does not look ill. The head enclosed is a very fine one.

Lux et Salus.—We shall have pleasure in aiding you so far as our knowledge goes, if any application be made to us.

J. H. J.—So far as we can see, the general plan is the best which can be adopted under the circumstances. We should prefer more than 6 feet for both roof and side-light, not less than 9 or 10. We should also have light on the other side of the ridge-roof. 2. There is no doubt about the possibility of producing direct enlargements in this country by means of the solar camera. The only question is one of exposure and constant attention, to move the apparatus as the sun moves. Monckhoven's is more rapid, on account especially of having a larger condenser. The same printing process may be used as for ordinary printing; perhaps it would be wise to employ a highly salted albumenized paper and strong bath, as a means of securing the greatest sensitiveness. Our reply by post could not have reached you earlier than this, as the letter did not come under our notice until the day before our going to press.

B. R. T.—Thanks. Well meant; but inadmissible.

Several Correspondents in our next

⁂ Owing to the necessity of going to press a day earlier this week, the answers to many correspondents must stand over until next week.

◆

Photographs Registered.

Mr. F. Downer, Walford,
Four Views of St. Alban's Cathedral.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 396.—*April* 6, 1866.

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PHOTOGRAPHIC REPRODUCTION OF PAINTINGS.

We have so frequently urged upon photographers the importance of their art as a means of reproducing and multiplying good paintings and works of art, that we have little to add to what we have already said. For many purposes it is tolerably certain that photography must largely supersede engraving, as being a much cheaper, more rapid and faithful method of reproducing paintings. The engraving of a steel or copper plate is a work involving much labour, time, and cost, which can only be risked for the most popular class of works, the demand for copies of which will repay the heavy first outlay. Photography may be so readily and cheaply applied in producing all works of merit, that hundreds or thousands of excellent paintings, which would otherwise never be known beyond the walls of the exhibition where they were first hung, might be reproduced and published, giving pleasure and culture to thousands of persons, and creating for the painter a public he would never have possessed. The engraving—although, if a good one, possessing charms of its own—is but a translation of the painting, whilst photography is, in many respects, a literal rendering of the exact manner of the master.

We are glad to perceive that this method of reproducing paintings, which has so long been a practical success on the Continent, has of late begun to obtain systematic recognition in this country. We have had occasion more than once recently to notice some excellent reproductions of this kind, and during the past week we have received tickets for private view of two excellent exhibitions of photographic reproductions of paintings more extensive than any that have hitherto come under our notice. Messrs. Marion and Co. have invited attention to a most extensive and important series of such pictures, consisting of photographic reproductions, of large size, of the great masters in the galleries of Madrid, Dresden, &c., many of them pictures which have not—even in engraving, we believe,—been seen in this country; and Messrs. Bassano and Davis exhibit reproductions of nearly two hundred modern paintings by the best painters of the day. In referring to the latter, we may, with propriety, quote some excellent remarks on the general subject with which Messrs. Bassano and Davis have prefaced their catalogue:—

> The chief consideration which they have had in view, in copying the oil paintings, from which these photographs have been taken, has been to test the capabilities of the new art or science of photography when applied to the reproduction of works of art, and in so doing to discover whether it were possible, by overcoming manipulatory details, to render photographs sufficiently perfect to insure universal approval. If success can be attained in this respect, a photograph, with its truthful exactness and marvellous detail, may be considered as desirable as an engraving, which, after all, is but an imitation of the original, whereas the photograph is the direct reflection of it—giving not only the drawing, composition, and effect of the subject to be reproduced with perfect truthfulness, but showing also the manner, touch, and *spirit* of the painter.
>
> Again, the peculiarity of photography is such that the *method* of one painter may be distinguished from that of another; whereas in engraving, on the contrary, the *method* of the engraver is displayed rather than that of the painter. The power of photography in this respect may be discovered in several instances in the present collection; but more especially in the photographs from paintings by E. M. Ward, Sant, Ansdell, Leighton, Beavis, A. Johnstone, &c. In Ansdell's picture of the dogs' heads (No. 11), the detail, the touch, the silky smoothness of the dogs' coats, and the gradations of tone, are all produced exactly as they appear in the original, and the peculiar manner of this artist's manipulation is represented; whilst, on the other hand, in Leighton's "The Warrior" (No. 125), the rough loaded brush of the painter is shown with interesting truthfulness, and another *style of handling* exemplified; again, Mr. Leighton's other *manner of touch*, as shown in his "Dante" picture, in the Royal Academy two or three years since, would be depicted with equal fidelity; here the smooth enamelled appearance of the painting would be rendered, and the manner of the work concealed, as in the picture itself.
>
> These observations have been called forth because it has become a custom to compare photographs with engravings, much to the detriment of both arts. The art of engraving, when represented by such examples as Sir E. Landseer's "Piper and a Pair of Nut Crackers," must be considered as having been brought in the present day to a state of perfection; nothing could surpass the exquisite beauty of effect and delicacy of manipulation shown in this engraving; but, on the other hand, a photograph of the same oil painting would have other and distinct merits, not to be compared with those of the engraving, and would possess an independent and singular value accordingly.

In endorsing the latter remarks on engraving, we may observe, that in maintaining the art value—especially for reproductive purposes—of photography, we gladly admit all the distinctive excellencies of a fine engraving with which photography cannot vie; and those beauties which make such an engraving as that referred to—Cousins' "Piper and Pair of Nut Crackers"—valued for its own sake, independently of its relation to Landseer's painting, will, we think, prevent engraving falling entirely into disuse, as some have feared. Photography will drive out of the field inferior engravings, as it has driven out inferior miniature painting; but good engraving will doubtless maintain a position amongst the lovers of good art.

The reproductions of Messrs. Bassano and Davis vary in size from about 8 by 6 to 20 by 16 inches, and comprise a great variety of subjects, in the treatment of all of which great skill and judgment have been displayed in obtaining the effects best calculated to do justice to the subjects, which include every variety of landscape, figure, architecture, portraiture, &c. In glancing over a collection like this, a person unacquainted with photography might readily believe that the difficulties attending the copying of oil paintings had generally been over-rated, and that the trouble attendant upon the presence of non-actinic colours in the pictures scarcely existed at all, so harmonious and satisfactory are the majority of the photographs, and so skilfully have the difficulties inseparable from such work been overcome. We trust that the enterprise will be as successful as it is deserving.

The great works to which Messrs. Marion and Co. are now inviting the attention of lovers of art consist chiefly in the reproduction of the works of the great old masters, whose glory has not been paled by contrast with works produced after the progress of three or four hundred years. The first series of the Madrid Gallery consists of 165 prints, averaging 12 by 10 inches in size, by Mr. J. Laurent, under the direction of M. B. Loriano et Murillo, director of the Spanish National Museum. Connoisseurs have been less familiar with the paintings in the Madrid Gallery than with those in many continental collections. As might be expected, it is exceedingly rich in examples of Murillo and Velasquez, besides having fine examples of almost all other masters of celebrity. All these photographs are taken direct from the original paintings, which gives them an especial interest and educational value. Their chief interest, however, centres here, as many of the prints are suggestive of the difficulties under which they have been produced; which all who have attempted to copy a very old painting, which may not be touched, washed, &c., well know. As the pictures were not permitted to be removed from the Gallery, these difficulties would be increased a hundredfold. When these things are remembered, the copies will be pronounced exceedingly good. Some are marvellous in their truth and detail, which seem to vie, with these qualities, in photographs taken from nature: we may especially mention the Van Eycks, the Madrid examples having the same characteristics which distinguish those in our own National Gallery.

The next important series consists of one hundred and eighty reproductions of the principal pictures in the Dresden Gallery, with historical and artistic explanations by Herr Hanfstœngl. These are done in four sizes, from cards to 26 by 19 inches. The mode in which the Dresden pictures have been reproduced gives them much of the character of engravings. They are not produced direct from the pictures, but from copies in monochrome, made expressly for this purpose, in which the colour of the master is translated into light and shade in a manner similar to that of the engraver. This work appears to have been done with great skill, and the photographs are as perfect as pictures as we can well conceive them to be, having all the brilliancy and delicacy of engravings.

The excellence and large size of many of the German reproductions exhibited at Messrs. Marion's gallery are worthy of especial remark. Anything more perfect cannot be desired; perfect in gradation and brilliancy, and altogether spotless and untouched, the photographs of 30 inches by 20 inches are as perfect as card pictures. Many of these, when coloured, are scarcely distinguishable from fine water-colour drawings.

Continental photographers seem to be fully alive to the importance of this branch of our art. It is, perhaps, scarcely to be expected that photographic reproductions of paintings will ever realize such large returns and immense profits as have been secured by the engraving of popular pictures; but the history of this branch of art commerce is very suggestive and significant. The enormous sums paid by print publishers in this day for copyrights in paintings are tolerably well known, although they have not yet become matters of history. Less than half a century ago a firm agreed to pay Sir Thomas Lawrence £3,000 per annum for the exclusive privilege of engraving and publishing his pictures, another firm having just paid the same artist £10,000 for the right to engrave some half-dozen pictures. The receipts from one engraving alone—the "Death of Wolf," by West—amounted to £15,000. Facts like these might be multiplied *ad infinitum;* and we believe that if they cannot be paralleled by the results of photographic reproductions of the works of our greatest living artists, they are suggestive of a much larger success in this direction from well managed enterprize than has yet been conceived by photographers.

CARBON PRINTING AND REPRODUCTION.

The one cogent argument against the general use of photography as a mode of reproducing paintings has been based upon the doubtful permanency of the prints. Painters and connoisseurs have alike agreed that nothing could be better than many of the photographic reproductions, "if they would only last!" "Oh," said Mr. Ruskin, the other day, to a friend of ours, "if photographs can be made permanent, they will be worthy of important consideration." This question of permanency is, of course, of much importance in regard to photographs generally; but it must be admitted that many which are produced are only intended to serve an ephemeral purpose, and their existence ten years after they were taken is a matter of the smallest possible importance. But in the photographic reproduction of works of art, the question of permanency is most vitally connected with the success of any great commercial enterprise, such as we have glanced at in the preceding article.

Carbon printing, then, useful for all forms of photography, presents itself as of essential importance in connection with that branch in which photography is destined largely to supersede engraving. On this ground alone it ought to be able to answer the challenge on the score of permanency as well as engravings. We are glad to state that this importance has, by some photographers, been practically recognised. We have before us a noble reproduction, 22½ inches by 12½ inches, of Herring's Horse Fair, by Messrs. Holroyd, of Harrogate, printed by Mr. Swan in carbon. Messrs. Holroyd have purchased the copyright of this painting, with the express view to its publication in this form, as the first of a series of carbon prints of original paintings which will be duly issued by the same firm. The enterprise is a most worthy one, and most worthily commenced. The picture before us is most admirable. The subject is essentially English in its character: a piece of open country, adjoining a town, is the scene of the fair, and is covered with groups of horses of all colours, standing, walking, running, rearing, accompanied by ostlers and dealers, farmers and gentlemen, all excellently grouped, and forming a scene full of life and animation. The well painted distance and fine sky are most admirably rendered, the texture of the carbon print lending itself to effects of this kind much better than the glaze of albumenized paper. The print before us is of a delicate purple brown, much resembling that of a gold toned print; but we have seen copies from the same negative which, being of a warm black, possessed more force, and gave still better effect to this picture, and were in every way excellent.

Mr. Annan, of Glasgow—of whose excellent reproductions we have often had occasion to speak, and which, having been selected for several years in succession by the Glasgow Art Union for distribution amongst the members, offers striking evidence of the satisfaction which such reproductions afford—has also resolved, as we recently announced, to employ carbon printing for future work of this kind, and recently given Mr. Swan an order for two thousand prints of reproduction of unprecedentedly large size, Mr. Dallmeyer having recently manufactured a triple lens to cover 24 inches by 24, for the purpose of producing the negatives.

PHOTO-LITHOGRAPHY WITH HALF-TONE.

The production of printing surfaces on stone, zinc, &c., by the agency of photography, has occupied the attention of experimentalists for many years, and in many respects a high degree of success has been obtained. The process of Mr. Osborne, for the working of which a company has recently been formed in America, gives results in line and stipple which leave little to be desired. Mr. Ramage, of Edinburgh; Mr. Lewis, of Dublin; Col. James, and many others have also attained great excellence in the same direction. Messrs. Simonau and Toovey, of Brussels, have attained some success in the production of half-tone, and the attempts of Col. James in the same direction have not been without promise. Still the fact remains, that no process for the actual production of photographs from nature by means of photo-lithography is in practical working, or has hitherto established a position, and that such a process remains an important desideratum, any means of meeting which would be hailed with a glad welcome by all concerned in the graphic arts.

Unless we are mistaken in our estimate of a series of specimens before us, by Messrs. Bullock, Brothers, of Leamington, a process they have recently patented bids fair to meet the long-felt want most successfully, and to render, with a fair amount of delicacy, the true photographic gradation of negatives from nature. The subjects before us, consisting of landscapes with variety of foliage and architecture, are exceedingly excellent, and present all the good points of a good photograph, perfect gradation and half-tone, and great brilliancy, differing little in general effect from good silver prints from the same negative.

Messrs. Bullock have followed in paths already partially trodden, but have made such practical deviations and modifications as have led them to success where others have only failed. Their aim is to secure in the transfer a suitable grain, so as to obtain the kind of gradation possible in lithography, without producing a coarse or woolly effect. Amongst various methods by which they propose to effect this end, the plan used in producing these examples seems to be at once the most practical and efficient. A transfer paper is prepared with a plain solution of gelatine, and when this is dry, a grain is printed on to it from an aquatint plate. Paper so prepared can be kept in stock, and rendered sensitive when required by immersion in a solution of bi-chromate of potash. It is then ready for printing and transferring in the usual manner, and produces on the stone a photographic image, the continuous gradation of which is broken up into the stippled gradation of an equatint plate. This is the broad principle; but it admits of much ingenious modification in practice, which is so far effective that it produces the most successful and promising examples of photo-lithography with half-tone which we have yet seen.

Our readers will shortly have an opportunity of forming their own opinion of the excellence of the results to which we have referred, as Messrs. Bullock, Brothers, intend to place before them the first-published specimen of their method, which will, we hope, be ready in a few weeks. We hope then to say more on the subject, and of the projected arrangements for putting the process into commercial operation.

Mr. Bullock will read a paper on the process at the meeting of the Photographic Society on Tuesday evening next.

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INFRINGEMENT OF PHOTOGRAPHIC COPYRIGHT.

A recent case at Lambeth Police Court, reported in the *Standard*, again illustrates the indisposition of magistrates to convict in cases of photographic piracy. If the report we quote be correct, the decision is a remarkable instance of *non sequitur*. After certain evidence of the proprietorship of the copyright by the plaintiff, and its infringement by the defendant, who denied having sold the piracies in question, a witness "swore positively" that he had supplied defendant with the two photographs which he declared had never been in his possession. "On hearing this," continues the reporter, "Mr. Elliott said the complainants had completely failed in proving their cases, dismissed the summons, and, on the application of the defendant's attorney, allowed him two guineas costs!"

We know nothing of the case whatever beyond what is reported in our daily contemporary, but we repeat, that if the statement there given be a correct representation of the facts, it seems to us a singular miscarriage of justice. Because a witness, called by the defendant himself, swears positively that he supplied that defendant with certain prints of which he has denied any knowledge, that defendant is acquitted with costs!

In giving the case, we may premise that the name of the plaintiff in the case is that of Mr. Bingham, the eminent photographer of Paris, who has good claim to the credit of having first used collodion in photography. Mr. Graham, his chief witness, is a highly skilful and cultivated amateur, and, from our knowledge of these gentlemen, we should form a strong conviction of the justice of the case, which seems to have been oddly dismissed with costs. The case is reported as follows:—

Photograph of Lord Brougham.—*Mr. Francis Sawyer*, a photograph seller in the Crystal Palace, appeared before Mr. Elliott, to answer to a summons taken out in the name of Mr. Robert Jefferson Bingham, also a photographer, and charging him that he, not being the proprietor of copyright in a certain photograph, or without the consent of such proprietor, unlawfully sold two repetitions of the same work, contrary to the statute.

A solicitor, on the part of the complainant, Mr. Bingham, in opening the case, produced a photograph of Lord Brougham, as the subject of complaint, and said that had been taken by his client, Mr. Bingham, who, in order to retain a copyright in it, had caused its registration in the usual way. The defendant, notwithstanding, and as he should be able to show, had sold at his place of business in the Crystal Palace two copies taken from the original photograph, and, having no authority from Mr. Bingham to do so, had made himself liable to a penalty of £10.

Mr. James Graham, of Surrey Lodge, Lambeth, who described himself as a barrister, was here sworn, and said that on the 3rd of January last he purchased, at the stall of Mr. Sawyer, in the Crystal Palace, the two photographs of Lord Brougham for one shilling, and he had no doubt they had been taken from the registered photograph of his lordship.

In cross-examination, the witness admitted that he was a good deal connected with photographic matters, and dealt in them; but he subsequently corrected himself, by saying that, though he had a number of photographic subjects in the Crystal Palace, they were sent there by request of Mr. Grove, the Secretary, and did not sell single photographs.

In reply to the case, it was positively denied that the photographs spoken to had been purchased from the defendant, and to prove this fact, Thomas Latchford, an intelligent youth, was called into the witness-box. When sworn, he said he had been in the service of Mr. Sawyer for three years, during which time he had had the management and sale of the photographs at his place in the Crystal Palace. The three photographs produced he had never seen before, and he was quite certain he had not sold two of them to Mr. Graham, nor had he, to his knowledge, seen that gentleman before. The only photograph which was sold by his master of Lord Brougham was one taken of his lordship and nephew together.

Mr. Ball, who is in the habit of supplying Mr. Sawyer with all the photographs he sells, swore positively that he had supplied him with the two photographs of Lord Brougham produced.

On hearing this, Mr. Elliott said the complainants had completely failed in proving their cases, dismissed the summons, and, on the application of the defendant's attorney, allowed him two guineas costs.

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ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

Photographers' Provident Fund—The French International Exhibition—The Photographic Society of Scotland Exhibition—The Royal Academy—Additions to the Developer—The Beginning of the Season and Dry Processes—Reproductions—The Societies.

"Make hay while the sun shines, that you may be provided for a rainy day," is a proverb that should, from the nature of their profession, be oftener suggested to the minds of photographers than to the followers of any other calling. The sun has shone, and is still shining, on photography as a profession, and yet no organized preparation, which should be first thought of in prosperity, has yet been made against those bitterest of "rainy days"—sickness and old age. Other trades have their benevolent and provident societies: why should photographers not have theirs? Some three years ago, this subject was energetically urged upon the attention of those most concerned, by the Editor of the News, but, after a little flickering, the subject was allowed to die out. The case of Howard, reprinted from the *Standard* in the News of March 23, which must have attracted the attention of most of the readers of this Journal, again eloquently suggests the necessity of such an institution. The history of this unfortunate photographer shows that it is possible that those who are now well to do may sometime require assistance. The son of a barrister, who was for three consecutive years mayor of a large town, Howard was apprenticed to a surgeon, and was a student of University College under Liston, and is described as having been a clever and gifted man, but, from illness and a variety of unfortunate circumstances which it is not necessary to repeat here, he fell from bad to worse, until he was found, by the author of the article in the *Standard*, on the Relief-Book of the Holborn Union, and when visited in his miserable garret, was discovered, with his wife and children, in a state approaching starvation. Surely this case is sufficiently dreadful to make all photographers, from the plate-cleaners to the heads of the largest establishments, think seriously of the necessity of forming an institution connected with the art, which would save its members from the want and misery which is often attendant upon misfortune.

The building for the French Universal Exhibition is progressing rapidly. It has been decided, at the instigation of M. Ernest Lacan, that photographers of all nations shall have an opportunity of exercising their skill for the benefit of visitors to this enormous gathering of the arts and manufactures of the whole world. An "International Studio of Photography," composed of a number of pavilions, will be erected in the park surrounding the principal building. One half of the sets of rooms will be let to French photographers, the other half will be reserved for those of other nations, who will be allowed to exercise their calling according to their different specialities. These privileges will not include that of taking views in and about the building, the monopoly of which has been secured by M. Pierre Petit, and which, by-the-bye, is now causing considerable commotion amongst the Parisian photographers, who are inundating the public press with protests against the concession. All this preparation for representing the art on a large scale looks very well on paper, but I cannot understand how the individual photographers are to make any profit out of the undertaking. M. Petit has contracted to take and sell pictures in the Exhibition, for which right he has paid £2,400. He will have to build his own operating-rooms, will have to allow exhibitors 25 per cent. on the selling prices, and to take gratuitously the portraits of all persons employed in the Exhibition, about 20,000 or 30,000 in number! It is further agreed the Commission have the right to destroy all prints of which they do not approve. This does not appear to be an encouraging speculation, but, as far as I can learn, the tenants of the Portrait Pavilions appear to be quite as hardly dealt with. The rent of each, I believe, will be £1,200, besides other payments. The Exhibition will be open about six months, or 156 working days, which makes nearly £8 a day for rent alone. As there will be a large number of these studios, it will take at least all the world, with perhaps a planet or two, to supply sufficient customers to make this venture pay.

The Photographic Society of Scotland has collected together a very fair show of pictures for its competitive exhibition, which opened early in the month. It is very pleasing to notice the works contributed by members of the Society, which, for number and excellence, could scarcely be equalled by the photographers of any other city in the world (with the exception of London and Paris), and which afford a marked contrast to the meagre display of the Dublin photographers at their great exhibition last year. Mr. Moffat, Mr. Neilson, and Mr. Dallas are the principal local exhibitors of portraits. Amongst the landscapes, those of Mr. W. D. Clark are the most attractive, although many charming views are sent by the Rev. D. F. K. Drummond, Mr. Annan, and Mr. John Smith. The chief southern exhibitors are, Mr. Rejlander, whose works appear here for the first time for eight or nine years, and, by their originality and beauty, attract and delight painter and photographer alike; Mr. Blanchard, the subtlety of expression and the breadth of light and shade of whose "Zealot" gives promise of future valuable works of the kind from the same hand, and whose frame of instantaneous views have probably never been equalled; and Mr. England, who sends a collection of his well-known views. The competition for the medal for enlargements is, numerically, very strong, and it is curious to notice that the largest number of these pictures are not enlargements proper, but prints from enlarged negatives, which, for impressions up to a certain size, appears to be the present popular method of enlargement. Mr. Netterville Briggs (of Leamington) and Mr. Samuel Fry exhibit especially perfect examples of this method. Soft, round, and brilliant, these capital prints have all the qualities of portraits taken direct. The same might be said of Mr. Hooper's enlargements on albumenized paper by the ordinary methods. With the exception of the works of Mr. Rejlander and Mr. Blanchard, there is such an absence of startling novelties that it would be difficult to predict where the medals for pictorial excellence will go; but the carbon process of Mr. Swan, and the photo-relievo process of Mr. Woodbury, appear to call upon the judges to exercise their discretion as to extra medals.

Will photographs ever be admitted into the exhibition of the Royal Academy? and will photographers ever be called to join the ranks of the Royal Academicians? Although great changes are about to be made in this institution, I do not expect that amount of justice will be done to our art during the present century. The idea seems Utopian, but it is not so. The existing laws of the Academy admit to academic honours historical painters, landscape painters, portrait painters, flower painters, sculptors, architects, engravers, die-sinkers, watch chasers, and enamel painters. A reference to old catalogues will show that professors of each of these branches of art have been academicians: then why not photographers?

It has always been my creed, that in photography—as, indeed, in nearly all other arts—the best effects are produced by the simplest means. Complications of all kinds are best avoided. Success does not depend upon the addition of a few grains of gelatine to a pint of developer; neither is it any nearer if the operator take the trouble to go through a series of chemical feats to get the gelatine into his solution in a strictly scientific and difficult manner, and obtain a developer of such a potent nature (scientifically) that it can only be expressed in a line of symbols as unintelligible to the majority of readers as Arabic or Coptic. Neither, as a rule, do I believe in any photographic preparation of which I do not know the constituent parts; but general principles always admit of slight deviations, and there are quack medicines in which most people believe—Cockle's pills and Babington's Elixir, for instance. All this leads in a round-about manner to what I have to say. I have been using, and enjoying the use of, what I must call—as it is a secret—a quack preparation, in the shape of a powder, to be added to the developer. It consists of a white salt, prepared by M. De Latour, of Jersey, a small quantity of which should be added to the developer. The resulting negatives are found to be rich in all the qualities which good negatives should possess. They are creamy in colour, and full of detail, the very opposite of the thin, poor, starved substitutes for negatives—and which should be more properly called bad positives—that some operators affect. Sufficient intensity can be obtained with one application, and, unlike the gelatine developer, it does not prolong exposure. I think I could give a guess as to the nature of its composition, but to publish a process which the inventor wishes to keep secret would be to take a mean advantage. All that we have to demand of M. de Latour is, that he supply photographers with his preparation, or, failing that, by publishing details himself, give them an opportunity of making it for themselves.

The meteorological prophets predict good news to photographers: we are to have a fine dry season, and it is to begin early. Let us hope that it has already begun. This time last year—this might be seen by turning to the "Echoes" of last April—the weather suddenly changed from snow storms and north-east hurricanes to the most genial spring time, a change as great as from "the weather and the parks" to "the weather and the crops." The last few days have been sufficiently fine to allow those experimental photographers who have been preparing trial plates of the various dry processes to prove them. A friend who has been making comparative experiments in this direction, has arrived at the conclusion that for certainty and beauty of result nothing equals the collodio-albumen process, as described by Mr. Mudd, although Mr. Ackland's modification of the Fothergill process comes very near to it. The tannin process and its many varieties have been more or less failures. How is it that there are so many varieties of this process? When a photographer is unfortunate enough to be persuaded to dabble with tannin, he immediately finds it necessary to modify it, which would almost indicate that he was not able to do much with the process as he found it. There is another curious fact I have noticed about dry processes. The collodio-albumen is so perfect that modifications are never thought of, and it is the *only* dry process which has produced pictures that have been at all famous.

The production of copies of pictures by photography is now becoming a very important business, and is attracting the attention of photographers increasingly every day. Painters, also, are beginning to perceive the policy of having their works popularized by means of photography. A glance at the amazing undertakings of Messrs. Marion, Son, and Co., and others, in this way, will be sufficient to show that our art is encroaching rapidly on that of engraving, in translating the results of the painter's genius for the benefit of the public.

At the Photographic Society of London, Mr. Dunmore read a paper on the Organic Iron Developer, which he illustrated with some good specimens. Mr. Swan described the Actinometer he employs in carbon printing, and exhibited some specimens of that process which called forth many expressions of wonder and approbation. These specimens have now been shown at most of the London and Provincial Societies, and have been received with enthusiasm by all. Mr. Swan has illustrated its application to all kinds and sizes of negatives; witness the fruits of Mr. Holroyd's copy of Herring's "Horse-Fair," perhaps the finest reproduction of an oil painting yet exhibited; Blanchard's "Zealot," most judiciously chosen as the presentation print of the South London Society; and the prints from Bedford's exquisite landscapes. One of the prettiest applications of photography I have yet seen, and which, owing to the counter attraction of the carbon prints, did not receive sufficient notice at the meeting, was some splendid specimens of photography on silk, for application to fire screens, &c., by Mr. Hooper.

The attention of the North London Association was principally occupied by reading the annual report, and the election of officers for the ensuing year. Mr. Dunmore read a paper on the "Connection of Photography with the Fine Arts." The most pleasing feature of the evening was the passing of a resolution to present the Hon. Secretary (Mr. J. Barnett) with a testimonial. Surely no secretary ever deserved better of a society than Mr. Barnett does of the North London Association. No gentleman has ever more devoted himself to the performance of the duties of an honorary office, and no officer could be more thoroughly beloved by the members of a society. The Association have done honour to themselves in doing honour to Mr. Barnett.

The proceedings of the South London were as honourable to the majority of the members as those of the North London, only in a very different way. A paper was read by a member, whose name I do not care to write, with a title which would indicate that he was at last about to teach a few art truths; but the members were irritated, and showed their displeasure in a marked manner (and herein showed their honourable feeling), to find that the writer had nothing to offer to the meeting but ill-concealed personal abuse levelled at some of its members. This called forth a dignified reproof from Mr. Howard, the courteous honorary secretary, which was followed up by the able Chairman, who did not feel himself at liberty to propose a vote of thanks for the paper. It is a sad and a pitiable thing that these bitter feelings should exist at all; worse, that they should be dragged before the public in any form; but worst of all, and utterly indefensible, that they should be introduced into a society, and that under the guise of a paper on art, a display of morbid irritability and personal bitterness should be exhibited, such as Mr. Howard well said had never been seen in that society before.

Reference to the Provincial Societies can only be of interest when there is anything interesting to report or to comment upon. This month, the only matter which has especially excited much attention has been already commented upon in the News of March 29, under the head of "Mr, Swan's Carbon Process,"

THE ACTION OF LIGHT ON PHOTOGRAPHIC PAPERS.

A lengthy communication on this subject was made at a recent meeting of the Chemical Society by Mr. Charles R. Wright, B.Sc., from which we make condensed abstracts of such portions as will most interest our readers. The object of the enquiry is thus described :—

In a paper published in the journal of the Chemical Society, by Mr. A. McDougall, a method of measuring the relative sensitiveness to light of photographic papers is described, and the results detailed of a series of measurements, giving the relative sensitiveness of papers salted with solutions of different strengths of sodium-chloride, potassium-chloride, ammonium-chloride, and potassium-bromide, and afterwards floated upon a strong silver-nitrate bath of constant composition. From these experiments it appears that the sensitiveness of a photographic paper depends solely on the quantity of the halogen contained in the salting solution, and that it is not influenced by the metal with which the halogen is combined; for, if the results of his experiments on papers salted in solutions of chlorides of varying strengths be graphically represented with percentages of chlorine as ordinates, and relative sensitivenesses as abscissæ, the three curves obtained with solutions of sodium-, potassium-, and ammonium-chlorides will be found to coincide within the limits of experimental error. This conclusion is also borne out by the fact that papers prepared with solutions of potassium-, sodium-, ammonium-, and barium-chlorides, in such a manner that equal quantities of chlorine were contained in each, were all found to possess an equal degree of sensitiveness, whilst the same was also found to be true for the corresponding bromides.

It next becomes of interest to examine the relative sensitivenesses of papers salted with different halogens; to compare, for instance, the sensitiveness of a paper salted with a solution containing 1 per cent. of potassium-chloride with that of one salted with a solution containing an equivalent quantity of bromine, or with one in which half the chlorine is replaced by its equivalent of bromine or iodine. The following investigation was undertaken, at Dr. Roscoe's suggestion, for the purpose of examining these questions.

After describing the methods adopted to secure certainty in comparison and some other points, he states ;—

In order to determine the relative times taken by papers prepared with various halogens to gain the same definite series of tints, papers salted in the undermentioned solutions were insolated in the disc-photometer and read off on a carefully calibrated strip:—

Potassium Bromide containing 6·386 per cent. of KBr.
" Brom-iodide " 4·452 per cent. of KI,
and 3·193 of KBr.
and 3·193 of KBr.
" Chloro-bromide " 2·000 per cent. of KCl,
" Chlor-iodide " 2·000 per cent. of KCl,
and 4·452 of KI.
2·128 of KBr.
and 2·969 of KI.
" Chloro-brom-iodide " 1·333 per cent. of KCl.

All the above solutions contain precisely as much potassium as exists in a solution containing 4 per cent. of potassium-chloride. The mixed solutions (brom-iodide, &c.) contain equal quantities of potassium combined with different halogens. In order to verify, beyond doubt, the results thus obtained, the same papers were exposed in the pendulum photometer and read off as before; whilst, as a third check, the same papers were directly exposed to sunlight for known times and read off.

The results of the five variously prepared papers when exposed to a constant source of light until they acquire the tint given by the chloride, is shown in the following table:—

Chloride.	Bromide.	Brom-iodide.	Chloro-bromide.	Chlor-Iodide.	Chloro-brom-iodide.
1·000	1·000	1·000	1·000	1·000	1·000
·975	·875	·810	·910	·875	·790
·950	·800	·735	·840	·800	·700
·925	·730	·660	·780	·735	·620
·900	·670	·580	·730	·680	·560
·850	·585	·500	·650	·600	·470
·800	·515	·420	·580	·535	·390
·750	·455	·350	·525	·480	·320
·700	·410	·290	·475	·425	·265
·650	·360	·240	·430	·375	·220
·600	·320	·200	·390	·335	
·550	·280		·355	·295	
·500	·240		·320	·260	
·450	·200		·290	·230	
·400				·200	

These curves were obtained by the use of salting solutions equivalent to a 4 per cent. potassium-chloride solution; but it having been previously shown that the rates of darkening of all chloride and bromide papers are respectively identical, whatever be the strengths of the salting solutions, this may be assumed to be true for all the others: hence the above numbers represent the relative rates of darkening of any papers prepared with these five halogens.

If the numbers for chloride paper be represented generally by T_c, and those for bromide papers by T_b, the connection between T_c and T_b is approximately given by the formula—

$$T_c = 2·4\ T_b - 1·9\ (T_b)^2 + 0·5\ (T_b)^3.$$

By the aid of this table, the relative sensitivenesses of any of the above papers with respect to any given tint can be calculated, when their relative sensitivenesses with respect to any other are known. For example, let it be required to compare the relative sensitivenesses of 4 per cent. chloride and the equivalent chlor-iodide, chloro-bromide, bromide, and brom-iodide papers, with respect to the tint taken as the normal in photometric observations (viz., that gained by 3 per cent. sodium-chloride paper on exposure for one second to light of the unit of intensity). As the mean of five experiments, it was found that on exposure for the relative times 1·000, 0·742, and 0·562, chloride, chlor-iodide, and bromide papers assumed tints which standard paper would have assumed (on exposure to light of the unit of intensity) in the times 0·509, 0·682, and 0·905 seconds. Let x, y, and z respectively represent the relative times in which the three papers would assume the normal tint, then their relative sensitiveness with respect to this tint are respectively $\frac{1}{x}$, $\frac{1}{y}$, and $\frac{1}{z}$; or 1·000, $\frac{2}{y}$, and $\frac{2}{z}$. Thus—

(1.) $$x : 1·000 :: 1·000 : 0·509,$$

$$\text{or } x = \frac{1·000}{0·509} = 1·965.$$

(2.) From the table, the relative times in which chlor-iodide paper would gain tints assumed by chloride papers in the relative times 1·000 and 0·682, are 1·000 and 0·407.

$$\text{Hence } y : 0·742 :: 1·000 : 0·407,$$

$$\text{or } y = \frac{0·742}{0·407} = 1·822.$$

(3.) From the table, the relative times in which bromide paper would gain tints assumed by chloride paper in the relative times 1·000 and 0·906, are 1·000 and 0·685.

$$\text{Hence } z : 0·562 :: 1·000 : 0·685,$$

$$\text{or } z = \frac{0·562}{0·685} = 0·820.$$

$$\text{Hence } \frac{x}{y} \text{ and } \frac{x}{z} \text{ are respectively } \frac{1·965}{1·822} \text{ and } \frac{1·965}{0\ 820},$$

or 1·078 and 2·396.

That is, the relative sensitivenesses of 4 per cent. chloride paper and its equivalent chlor-iodide and bromide papers with respect to the normal tint, are 1·000, 1·078, and 2·396 respectively.

Again, as the mean of twelve experiments, it was found that chlor-iodide and chloro-bromide papers, on exposure for the relative times 1·000 and 0·431, gain tints which normal paper would (on exposure to light of the unit of intensity) gain in the times 0·483 and 0·628 seconds.

Calculating as before, the relative sensitivenesses of these two papers are found to be $\frac{1}{4·000}$ and $\frac{1}{1·072}$, or 1·078 and 4·022.

Again, the mean of ten experiments gave the following numbers for bromide and brom-iodide papers:—

	Bromide.	Brom-iodide.	Bromide.	Brom-iodide.	Bromide.	Brom-iodide.
Relative times of exposure	1·000	1·867	1·000	1 678	1 000	2·552
Times in which standard paper would assume the tints gained by the papers exposed	0·861	0·621	0·943	0,648	0·732	0·553
Relative sensitivenesses ...	2·396	4 624	2·396	4·002	2·396	3·612

	Bromide.	Brom-iodide.
Mean relative sensitivenesses	2·396	4·060

Hence the relative sensitivenesses of the above five papers with respect to the normal tint are—

Chloride	1·000
Chlor-iode	1·078
Chloro-bromide	4·022
Bromide	2·396
Brom-iodide	4·060

In a similar way their relative sensitivenesses with respect to any other tint may be calculated.

The general results of the whole experiments, which we gave in a recent notice of the paper, may be here repeated:—

(1.) Papers prepared with solutions of different alkaline chlorides darken to the same extents in the same relative times, no matter with what alkaline metal the chlorine be combined, and no matter what be the constant percentage of chlorine in the salting solution.

(2.) The same holds true for papers prepared with bromide solutions (and hence, probably, for all the others).

(3.) Photo-chemical induction does not exist to any appreciable extent with chloride, bromide, and brom-iodide papers (and hence, probably, with none of the others).

(4.) The relative times for which pieces of any one of the above papers must be exposed to light of a constant intensity in order to gain a definite series of tints vary with each paper.

(5.) The relative intensities of light to which pieces of any one of the above papers must be exposed for a constant time, in order to gain a definite series of tints, vary with each paper.

(6.) The relative times for which pieces of any one of the above papers must be exposed to light of a constant intensity in order to gain a definite series of tints, are in the same ratio to one another as are the relative intensities of light to which the same pieces must be exposed for a constant time in order to gain the same series of tints.

(7.) The relative times for which pieces of any one of the above papers must be exposed to a constant source of light in order to gain a given series of tints, or the relative intensities of light to which they must be exposed for a constant time to gain the same series of tints, are given by the table on p. 162.

(8.) By the aid of this table, the relative sensitivenesses of any of the above papers with respect to any particular tint can be calculated, when their relative sensitivenesses with respect to some one given tint are known.

In conclusion, I beg to tender sincere thanks to Professor Roscoe for the valuable advice and assistance which he has given me in carrying out the above investigation.

BELGIAN INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

An International Photographic Exhibition, organised by the Royal Society for the Encouragement of Arts, under the patronage of the Town Council of Ghent and of the Belgian Government, will be opened at Ghent on the 12th August, 1866.

The Royal Society invites the photographers and the manufacturers of photographic apparatus and photographic productions of all countries to participate in this exhibition.

Regulations adopted by the Managing Committee:—

1. The Exhibition will remain open for two months at least.

2. The Exhibition will include every branch of photography: portraits, groups, pictures, views, reproductions, enlargements, microscopic and instantaneous photographs, all the applications of photography to art, industry, and science, photo-lithographs, coal and ink printing, heliographic engravings, photo-sculpture, photographs on linen, porcelain, glass, ivory, enamel, the applications of photography to topography, military engineering, natural history, medicine, astronomy, &c.

Sets of apparatus and chemicals will be equally admitted.

3. A jury, to be appointed hereafter, will award medals to the best articles in each category.

4. The Committee intend to buy a great number of photographs for a lottery, which will be drawn at the close of the Exhibition.

In order to defray part of the expenses, 20 per cent. will be previously deducted by the Committee from the price of every article sold.

5. The photographs must not be framed and glazed, but only mounted, so as to be ready for immediate exhibition.

Photographs of the carte de visite or small size to be mounted on large paper, side by side, in order that they may easily be put under glass, if necessary.

At the back of each article the exhibitor will mention, in a legible hand, his own name and the subject of the photograph.

The quantities of chemicals sent must not exceed what is strictly necessary to enable the jury to appreciate their qualities.

6. The managing Committee do not think it necessary to limit the number of articles to be sent by each exhibitor; they only hope that the exhibitors will make a discreet and judicious use of the latitude which is given them.

The Committee reserve to themselves the right of excluding such articles as should not be judged worthy of being admitted on account of the impropriety of the subject, or of their too great imperfection.

7. No article can be withdrawn before the close of the Exhibition.

8. The Committee will take every possible care in order that the articles exhibited may suffer no damage, but assume no responsibility in case of accident.

9. The exhibitors are requested to send to the Secretary of the *Société Royale pour l'Encouragement des Beaux-Arts, Gand (Belgium)*, a list of the photographs which they intend to send to the Exhibition, mentioning the process employed and the price.

The manufacturers of lenses, cameras, sets of apparatus, &c., are requested to send, with their price lists and prospectuses, all the necessary information concerning the use of their instruments.

All the lists and particulars to be sent by post a month at least before the Exhibition opens; with a view to facilitate transactions, these particulars will be printed in the catalogue with the price of the different articles.

10. All the articles to be exhibited must be delivered at the Exhibition building before the 1st August, 1866.

The articles will be forwarded to the Exhibition and sent back to the exhibitors carriage free, provided they are delivered in proper time to the correspondents whose names are mentioned below; the correspondents will have the articles packed, at the expense of the exhibitors.

The articles sent by railway will be forwarded under the regulations of Class 2.

The Committee do not consider themselves bound to pay for the carriage of articles not sent by their correspondents, or arriving after the 1st of August.

Framed photographs to be sent at the expense of the exhibitors.

For further information apply to the Secretary of the Society.

The following gentlemen have official charge of the management:—The *Chairman*, H. Rolin; the *Secretary*, Ferd. Vanderhaeghen; the *Commission*, Dr. D. Van Monckhoven, Ad. Noyt, Prof. Dr. Kekulé, Prof. De Vylder, Ad. Pauli.

Contributions sent to the following gentlemen in London will be duly forwarded to Ghent:—Mr. T. Ross, Featherstone Buildings, and Mr. Dallmeyer, Bloomsbury Street; and in Edinburgh, Messrs. Williams and Norgate.

PHOTOGRAPHIC PRINTING PAPER.

BY PROFESSOR TOWLER.*

The aim of those who prepare albumen, &c., paper for photographic purposes, appears to be that of manufacturing an article that will absorb the least amount of nitrate of silver, and still produce a good picture. This aim is, naturally, very praiseworthy. But all attempts will be futile, or, at least, will be likely to be so, unless the manufacturer has a succint and well-defined notion of that which he desires to accomplish, and of the means in art and science that might probably effect his purpose. To experiment with any solution that may by accident be placed before him, or occur to his thoughts, would be equivalent to fishing in the sea for pearls with a bent pin.

It is our intention to offer some hints on this subject for the benefit of those who are interested, and then leave the latter to devise proper methods for effecting the ends in view.

If albumen paper, such as is now in the market, be floated on a solution of nitrate of silver, it is a fact that this solution traverses the albumen film, and penetrates the texture of the paper.

This is a well-known fact. To prove this, it is necessary simply to place the back of such paper upon the negative, and to expose the same to sun-light. A picture will soon be visible in the paper, but scarcely at all visible on the albumen film.

This experiment testifies to two facts simultaneously; the first is, that the soluble chlorides in the albumen penetrate the texture of the paper; and that, secondly, the nitrate of silver follows their example.

But if thin plates of glass, mica, porcelain, &c., were substituted for paper, we know well that neither of the above-mentioned solutions proceed further than the surfaces of these materials. We are justified, therefore, in concluding that less both of the soluble chlorides and of nitrate of silver will suffice to produce the act of sensitization in the latter case than would be required if paper were used.

What per centage of nitrate of silver would be sufficient to sensitize a chlorized albumen film on glass, mica, &c.?

A solution containing five grains of nitrate of silver to the ounce of water would effect the purpose in three minutes; whereas, ten times this quantity would be required with most of the papers in commerce. The chlorides in the albumen vary in strength in the same proportion and for the same reasons.

A question, therefore, is immediately suggested.

Can paper be sized, or otherwise prepared afterwards, as to possess a vitreous or micaceous surface, which shall prevent the solutions in question from penetrating the texture beneath?

We entertain the opinion that this object can be effected; and we furthermore think that it has already been effected in certain papers for special purposes; for instance, in that prepared for the Wothlytype.

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* *Humphrey's Journal.*

Paper, without sizing or with a comparative small quantity of sizing, is bibulous; that is, it is in a condition for absorbing or imbibing liquids; and, it would appear, that the greater the amount of sizing in paper, the less is the capillary attraction in the fibrous pulp that constitutes the mass of paper. Hence, it seems right to apply more sizing to photographic paper than for that which is used for the ordinary purposes of life; and, furthermore, it is probable that we may eventually devise some substance or mixture of substances that will subserve the purposes more effectually.

In the first place, then, let us place before us categorically the different sorts of sizing used in the manufacture of paper, and thus study the individual and combined action of the components.

In Ure's Dictionary the reader will find the following quotations:—

"When the paper is dry, it is taken down, and laid neatly in heaps to be sized. Size is made of pieces of skin, cut off by the curriers before tanning, or sheep's feet, or any other matter containing much gelatine. These substances are boiled in a copper to a jelly, to which, when strained, a small quantity of alum is added. The workman then takes about four quires of paper, spreads them out in the size properly diluted with water, taking care that they be equally moistened. This is rather a nice operation. The superfluous size is then pressed out, and the paper is parted into sheets."

The preceding quotation refers to paper manufactured by the hand; but the principle remains the same in machine paper.

"*Formulas for Paper Size.*

"No. 1.

"Dry paper stuff ...	100 kilogrammes.
Starch	12 ,,
Resin, previously dissolved in 500 grammes of carbonate of soda	1 kilogramme.
Water	18 pails.

"No. 2.

"To 100 parts of dry stuff, properly diffused through water, add a boiling uniform solution of eight parts of flour, with as much caustic potash as will render the liquor clear. Add to it one part of white soap previously dissolved in hot water. At the same time heat half a part of resin and the requisite quantity of weak potash lye for dissolving the resin; mix both solutions together, and pour into them one part of alum dissolved in a little water.

"No. 3.

"Those who colour prints, size them previously with the following composition: Four ounces of glue, and four ounces of white soap dissolved in three English pints of water. When the solution is complete, two ounces of pounded alum must be added, and as soon as the composition is made homogeneous, it is ready for use. It is applied cold with a sponge, or rather with a flat camel's hair brush. Ackermann's liquor, as analyzed by Vauquelin, may be made for sizing paper as follows:—

"No. 4.

"Dry stuff...	100 kilogrammes.
Glue	4 ,,
Resinous soap	8 ,,
Alum	8 ,,

"The soap is made from 48 kilos. of pounded resin, and 2·22 crystals of carbonate of soda, dissolved in 100 litres of water. It is then boiled, till the mixture becomes quite uniform; the glue, previously softened by twelve hours' maceration in cold water, is to be next added; and, when that is totally dissolved, the solution of alum in hot water is poured in. Three quarts of this size were introduced into the vat with the stuff, and well mixed with it."

The preceding quotations are quite illustrative of what we wish to suggest; they show plainly what substances are used to prevent paper from imbibing moisture. Neither glue nor starch alone, however, although they may fill up all the pores of the paper, and cause adhesion to the different parts, would attain the end in view, because they are both soluble; but resin dissolved in an alkali and mixed with starch, renders the latter insoluble; in like manner, gelatine or glue is rendered insoluble by a solution of alum, by the formation of a species of leather, as is practised in certain branches of tanning.

The same end might be obtained by mixing in the dark room a bichromate of an alkali with the gelatine solution, and then sponging the paper with this solution, or floating the paper upon the solution. By exposing the sheets afterwards to light, the gelatine film becomes insoluble, and consequently impervious to moisture.

A solution of tannic acid may in like manner be used for converting the gelatine into an insoluble condition.

There is sufficient in this exposition about the sizing of paper to show not only what is required to render the surface of paper almost impermeable to fluids, but also the absurdity of obtaining patents on such flimsy grounds. Patents have been applied for by which the sole rights of rendering paper thus impermeable—in fact, of sizing paper a little more than usual—are to be secured to parties who aim to make money out of photographers by the silliest pretences. Look to your rights!

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PORTRAITURE BY MAGNESIUM LIGHT.

BY M. CAREY LEA.*

The principles that must govern the taking of portraits by this new source of light are somewhat different from those of ordinary illumination, and I have been asked to put some views, expressed by me on this subject, upon paper for *The Photographer*, which I do with pleasure.

It is to be remembered that the distance of the sun is so great, that the difference in illumination which falls upon the sitter and the background is inappreciable (if the glass-room is well-constructed). But with a light whose origin is close to the object, the ordinary law of illumination comes into play, viz., that the intensity is inversely as the square of the distance. Thus, supposing the magnesium to be burned at a distance of seven feet from the sitter, and the background to be five feet behind him, the intensity of the light on the two will be in the proportion of 7^2 to 12^2, or as 49 to 144; that is, the light on the sitter will be nearly three times as strong as that on the background.

The effect of this is to make the background black and inky, giving a dull, heavy look to the whole work.

The correction evidently lies in either bringing the background nearer, or else in using a very much lighter one. Probably the last will be found best, as there will be less danger of ugly shadows—another common fault in magnesium work.

Another fault in the new pictures is, that the contrasts are too great, and the same defects are visible as are produced in sun pictures by inexperienced hands. The remedy in this case will be found, I think, in largely increasing the dose of bromide in the collodion. In fact, the faults of the new pictures are exactly those which were most perceptible in the pictures taken upon iodide films before the use of bromide became general. Evidently the remedy lies in increasing the softening agency of the bromide. Recent experiments by Vogel, directed expressly to this end, have confirmed what all believed who had looked into the subject, that, whilst iodide films are more sensitive than bromide to *strong* lights, bromide films are more sensitive to weak ones than iodide. Therefore, *irregularity of illumi-*

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* *Philadelphia Photographer.*

nation is always best corrected by liberal use of bromide, a fact of which skilful philosophers know how to avail themselves.

A strong developer seems also needed for magnesium work; a liberal use of sulphate of iron, and a sparing one of acetic acid. Everyone has his own views as to developer, and it seems better merely to recommend each operator to strengthen the developer beyond what he habitually uses, than to name any definite strength of developer, unsupported by specific trials. In general terms, however, a developer containing 30 to 35 grs. of iron to the ounce, with one ounce of acetic acid to 15 or 20 of iron solution, would seem about right. If anything, rather more iron and less acetic acid than the reverse.

◆

DRY PLATE PROCESS FOR OPAL PICTURES.

In the United States, a method has been practised with some success of selling secret processes, or "secret peddling," as we have seen it phrased in their journals. A method of producing "porcelain pictures" was recently announced by Mr. Johnston, the details to be furnished for twenty-five dollars, equivalent to about five pounds sterling. By some means the secret was made public, and has appeared in the various American journals. We subjoin details of the process:—

Cleaning the Glass.—This part of the process, in combination with the after operation of coating the plate with albumen, requires great cleanliness. If the plates are new, they will only require soaking for a few hours in a solution of one part nitric acid to three of water; but if the plates have pictures on them, they should be soaked in a concentrated solution of potash and water. Let the plates remain in this solution until the film can be entirely removed by a tuft of cotton flannel tied on to the end of a stick; after which, wash the plates well, and leave them in the acid for a few hours. Then wash well to remove the last traces of acid, and stand up to dry.

Coating the Plate with Albumen.—Put 2 ounces of albumen and 6 ounces of water in a 16-ounce bottle: shake well for about fifteen minutes. Let the solution settle, and filter perfectly clear, through filtering paper which has been previously wet. When about to coat the plate, wet the surface with water, drain it, and then pour on the albumen. It should present a surface perfectly smooth and free from projecting particles. If this does not appear from the first flowing, flow it again with the albumen until it presents such an appearance, then stand up on blotting paper to dry. When the plate is perfectly dry, if it presents any streaks or markings, the operation has been imperfectly performed; therefore the plate should be moistened with a little of the potash solution, and rubbed over to remove the albumen, and again coated as before. When the operation is properly performed, the plate will appear as though nothing were upon it.

Sensitizing the Plate.—Flow the plate, and coat it in the same manner as any other plate. When it is fully coated and free from streaks, remove it from the silver bath, and wash it well for about a minute under a stream of running water; then immerse it for a quarter of a minute in the salt solution, and wash again for half a minute; then pour on some of the preservative solution, and flow it backward and forward for a quarter of a minute; drain well, and stand it away to dry in a perfectly dark box.

This operation should be performed in yellow light. When about to make a picture, place the dry plate in contact with the negative in an ordinary pressure frame. Expose to diffused light for about three seconds, more or less, as the case may require, according to the negative and strength of light. Then take the plate to the dark room, remove it from the pressure frame, and wash for a few seconds under a stream of water, and develop it. Take about a half ounce of No. 1 solution, and flow over the plate, in same manner as collodion, and drain it back again into the developing glass, and add to it about a quarter of a drachm of No. 2 solution; pour this on the plate and back in the developing glass a number of times, until the image is fully developed. The picture should be developed a little darker than it is intended to remain, as the fixing solution cuts it out a little. When perfectly fixed, wash for about three minutes, and place in the rack to dry. If it does not then present a pleasing tone, it may be toned to any extent with the toning solution; after which wash well and dry. The picture now possesses a very good surface for colouring; but it may be slightly improved by flowing the plate with the colouring solution. Stand on end to dry, so that it will not attract dust.

Formulæ.

Collodion.—	Alcohol	8 ounces
	Ether	8 ,,
	Iodide of ammonium ...	40 grains
	Iodide of cadmium ...	40 ,,
	Bromide of potassium ...	32 ,,
	Soluble cotton	80 ,,

More or less as the case may require to give the collodion the proper flowing consistency.

Dissolve the iodides in the alcohol and ether; then dissolve the bromide of potassium in a minimum quantity of water, and add to it the alcohol and ether; filter out the precipitate, and then add the cotton and enough tincture of iodine to give the collodion a port wine colour.

Silver Bath.—	Water	64 ounces
	Nitrate of silver ...	7½ ,,

Dissolve the silver in two-thirds of the water, and add a solution of iodide of potassium, dissolved in water, enough to give a precipitate which will not dissolve in about five minutes. Then add the other kind of the water, and filter perfectly clear. Acidulate with two drachms of pure glacial acetic acid. Then try the bath, as it should give clear, brilliant effects on ordinary glass, by the camera.

Salt Solution.—	Water...	1 quart
	Salt	160 grains.
Preservative Solution.—	Water ..	8 ounces
	Gallic acid ...	8 grains
	Citric acid ...	8 ,,

This solution and No. 1. of the developing solution should be mixed fresh every time they are to be used, as they will lose their properties by standing about a day.

Developing Solutions.—No. 1.

Water	4 ounces
Pyrogallic acid	6 grains
Citric acid	6 ,,

No. 2.

Water	1 ounce
Nitrate of silver	20 grains
Citric acid	40 ,,

This solution may be kept and used until the precipitate begins to fall, when it is better to mix more fresh solution.

Toning Bath.—Dissolve 45 grains hyposulphate of soda in 32 ounces of water; then dissolve 15 grains chloride of gold in 16 ounces of water, and add it, little by little, to the hyposulphate solution. Shake well, and when the mixture becomes clear as water, it is then fit for toning. Pour about an ounce of this solution in a small bottle repeatedly, until the desired tone is attained. After using, reject the solution, as it does not tone well a second time.

Colouring Solution.—	Alcohol	8 ounces
	Gum camphor... ...	2 grains
	Bleached shellac, pulverized	24 ,,

Place the ingredients in a bottle, and set in a warm place, shaking it occasionally, for about a day. Filter through paper, and it is ready for use. It is necessary to state that all the solutions should be filtered clear, and kept free from suspended particles.

Fixing Solution.—Hyposulphate of soda ... 1 pound
Water ... ... 24 ounces

In order to obtain sharp pictures on uneven glass, I use an extension box or tube placed in front of the printing frame, the length of which should be about three feet and tapering towards the end, so as to admit of an aperture large enough to receive a quarter-plate tube. By placing the tube towards the heavens, and receiving the light from it on the negative, a sharp picture can be made on glass which would otherwise be useless.

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Correspondence.

MR. CHERRILL'S THEORY OF DEVELOPMENT.

Sir,—In a late number of your journal, Mr. Cherrill asserted that no arguments had been "urged" against the formulæ upon which his theory of development is based. I showed that that part of his equations which is true is not new, and that which is new has not been shown to be true, for it is not founded upon a single experiment or fact; that the decomposition upon which he relies is improbable, if not impossible, as the balance of the affinities of the substances reacting are opposed to it; that the assertion of the existence of that decomposition and of its converse—the conditions under which both take place being identical—are two propositions essentially inconsistent and contradictory; and that as we know one to be true the other must be false.

Mr. Cherrill calls these observations one argument, and states that he has already replied to it. May I beg to ask Mr. Cherrill how he can have replied to my argument if no argument had been previously "urged" against the formulæ in question?

I cannot perceive the slightest analogy between the part which (NO^4) hyponitric acid performs in the process for obtaining sulphuric acid in the vitriol chamber, and that which acetic acid is supposed to play in development, according to the new theory. If Mr. Cherrill will state the reactions of the former correctly, he will readily perceive that the cases are widely different. The formula to which he calls my attention does not state those reactions correctly, and hence, probably, Mr. Cherrill's misapprehension of the two cases. His formula omits all notice of the chief agent in the changes which occur—the bisulphate of nitric oxide.

If the action of this interesting substance be duly considered, the reactions are neither anomalous nor contradictory, which certainly cannot be affirmed of the two formulæ propounded by Mr. Cherrill in his new theory.

If we are to admit the truth of the conflicting statements involved in these two formulæ, chemistry must be unlike every other science. We must admit that effects can take place without a cause, and that force may be overcome without the operation of superior force.—I am, sir, yours, &c., J. R. Johnson.

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Photographic Notes and Queries.

Blue Skies and Reflected Light.

Sir,—No doubt heat is very objectionable in a studio; and perhaps it may be as injurious to the latent image as Mr. Ayers suggests, though I have heard of instantaneous pictures under a scorching tropical sun; but heat alone will not account for the lengthened exposures I have always found necessary on deep blue cloudless days.

Our studio need never be many degrees above the outer air; but indoors or out, in summer or *winter*, white clouds give a quicker picture than a blue sky.

I have not yet tried Mr. Ayers' experiments, but think it proves my side of the question; that is, that though light is transmitted through *clear* fluids, it is neither reflected nor produced. If Mr. Ayers will photograph some white clouds against blue sky, I have no doubt but that he will find *reflected* light the strongest. Photographs of Alpine scenery usually have dark skies.

You suggest that I ought not to mind the trouble of preparing the tissue for carbon printing. If Mr. Swan's patent covers his present process, it might be interesting to try it, but it would not be business; unless he can arrange terms, which would surely be best done by undertaking himself to supply the tissue. Few photographers will submit to put another's stamp on their pictures, as, I believe, another patentee requires.—Yours truly, Ed. Seeley.

[We believe that Mr. Swan will be prepared to supply tissue to photographers shortly. The preparations for entering fully into such a business are somewhat extensive, and require time but are, we believe, in progress.—Ed.]

A Photographer's Relief Fund.

Mr. Editor,—Having read your leading article with much pleasure, I, for one amongst the many operators or professional photographers, cannot let the opportunity pass without thanking you, and also offering my assistance in the good work you have so kindly suggested—a provident society or relief fund for photographers, in sickness, infirmity, or *old age*, not forgetting "Death." It is only applying a portion of our earnings to this noble and generous act—trying to assist one another when we cannot assist ourselves. I would suggest or ask some gentleman to call a meeting in every large town, and report in your Journal the progress of the meetings, asking also all photographers of every class to become members or subscribers; and I feel confident we have many gentlemen connected who would act as president and committee to govern the society, and form rules and regulations for its guidance. Now that we have the chance, let me ask not in vain—let every photographer respond to the call. We may not want just now, but the time may come; therefore let us prepare for a rainy day, as it were, and provide accordingly, and have a provident society of our own. I shall be most happy to contribute *my mite* towards the good work.—Remaining yours truly, Lux et Salus.

10, *Crescent Place, Plymouth.*

Reducing Residues from Hyposulphite.

Sir,—A new system of precipitating silver residues was propounded to me the other day. Much to my surprise, I was told that a certain French chemist had made his fortune by buying the supernatant liquid (after precipitating the silver of old hypo, &c., by liver of sulphur), and treating such supernatant liquids with *muriatic acid.* Of course I protested at once against the possibility of such a result. But at once some old hypo (negative fixing) bath was brought forward in a glass measure, and some hydrochloric acid was poured into it, whereby a thick milkiness was produced. There is the proof, I was told; but as I could see no sign of a deposit—for it was very slow—I could not ascertain what it really was. That is, in fact, what I should feel obliged if you would tell me it may be. We know that by adding an acid to hyposulphite of soda, even before any silver be in it, it turns milky at once; but we know also that if to a solution of any chloride (say, for instance, chloride of sodium), we add more sulphuric acid, then the base unites with the sulphuric acid, and the chloride eliminated in the gaseous state; viz.,

$$\mathrm{Na\,Cl + HO\,SO_3 = Na\,O\,SO_3 + H\,Cl.}$$

But in this case is the weaker acid, which is otherwise eliminated, that is introduced, and which produces the milkiness and the deposit under investigation.

At all events, do you think this fresh imported news be worth any Ag.

[It seems to us, the only foundation for the truth of the statement brought under the attention of our correspondent is the fact that sulphide of gold is to a very slight extent soluble in hepar sulphuris and other alkaline sulphides, and it may happen that the refuse toning and fixing baths treated in this manner may not furnish the whole of the gold; but experience indicates that a considerable proportion is always retained by the insoluble sulphide of silver, and that if the use of a great excess of hepar sulphuris be avoided, there is practically no gold or silver left in solution. The negative fixing bath specified by our correspondent cannot contain gold, therefore must be advantageously treated by the sulphide process.—Ed.]

Talk in the Studio.

About Backgrounds.—As this subject is causing some little attention, a few words from a very old "Background Painter" may possibly be read with attention. Backgrounds to photographers—like Ireland to a Prime Minister—have ever been a difficulty. The greater portion of those in use are too decided, the detail too much made out, too hard, and too pronounced. A man may paint a very good scene for a theatre, and yet not possess the peculiar touch necessary to produce an effective photographic background. They should be hazy and mezzotint-like. One accustomed to work and wash in neutral tint is the most likely to succeed with photographic backgrounds. They can be very successfully produced by working with black chalk or crayons on a brown paper or cartoon ground, strained on a wall or frame, as all the edges and hard outlines can be softened down with a tuft of rag, or even the fingers. Those who are particular about their backgrounds will meet with many good sketchy examples by referring to some of the back volumes of the *London Journal*, and from among the free-hand designs of John Gilbert, on the first page of the publication named, some capital ideas may be picked out.

Manufacture of Portraits.—A correspondent says: "An enterprizing American, professionally engaged in producing portraits in oil, has just opened a portrait factory, where assistants prepare canvasses and panels by the hundreds. The background and figures all finished, minus the head, which the artist puts in from a photograph, after an approved canvas or panel has been selected from the lot. A photographer of our acquaintance, who has no convenience in the shape of a glass house for taking carte pictures, adopts very successfully, in many instances, the following plan:—He makes a drawing on thin paper (about four times the size of the usual carte picture), in neutral tint, the figure, male or female, sitting or standing, as the case may be, with a background to suit. He then takes, or gets, a photograph of the person he wishes to reproduce—just the head and shoulders—which is cleanly cut out and placed in position on the neutral tint drawing. The whole is then pasted down on a board, and a negative, three or four times reduced, taken from the same. Now, if this is managed with a little skill and dexterity, some very good and presentable results may be obtained. By this method, every picture has an entirely different and appropriate background.

Purifying Nitrate of Silver.—A French paper gives the following as a method of purifying commercial nitrate of silver, recently published by Mr. Maxwell Lyte. The trade article is first partially purified by crystallization; it is then re-dissolved to saturation in boiling water, and 1 per cent. of nitric acid is added. The liquid is constantly stirred while cooling. A crystalline powder is gradually deposited, which is collected on a filter and washed with water acidulated with 10 per cent. of nitric acid. The salt thus obtained is chymically pure.

Photography and Astronomy.—Our excellent contemporary, the *Scientific Review*, which contains frequent interesting paragraphs on matters pertaining to photography, has the following:—"Among the numerous applications of photography, none is more interesting or more useful than those which are dedicated to the purposes of astronomy. When Arago detailed to the Academy of Sciences the process of Daguerre, he predicted that it would one day be the handmaid of astronomy. His prediction has been completely fulfilled, and astronomers have largely availed themselves of the resources which it has placed in their hands. But none have been so successful in this direction as Mr. Warren De la Rue. With his 13 inch telescope he has obtained photographs of the moon so perfect that they bear being enlarged to a diameter of 3 ft.; and they are found so exact, when submitted to micrometrical examination, that they furnish correct data for the measurement of the vibration of the moon. They serve also as a foundation for the lunar map, 6 ft. in diameter, undertaken under the auspices of the British Association. Photography has enabled us to determine the relative heights and depressions of the mountains and ravines with which the surface of the moon is corrugated. Nor have the labours of the photographer been confined to our satellite; excellent pictures of several of the planets, also, have been obtained."

Vending Vicious Publications.—At the Middlesex Sessions, on Tuesday, before Mr. Bodkin, Assistant-Judge, Adolphus Henry Judge, alias Adolphus Henry Deflangue, was found guilty of selling and publishing obscene photographs, &c. The plan adopted by the prisoner was to send catalogues to officers in barracks, dockyards, and ships, also to public schools, seeking for an interview, at which he submitted his vile wares, and asked, and sometimes obtained, exorbitant prices for them. The prisoner was proved to have been previously convicted of a similar offence and sent to prison for twelve months. The Assistant-Judge sentenced him to two years' hard labour, and, at the expiration of that time, to find two sureties in the sum of £50 and himself in £100, to keep the peace and be of good behaviour for six months. The prosecution was undertaken at the instance of the Society for the Suppression of Vice.

The Truth of Photography.—During the stay of the "Melbourne Photographic Company" in this place, a man in the most deplorable state of rags and tatters went to the studio, and, after having made several large rents in his garments, where such did not exist before, he asked the operator for a piece of chalk; he then made his face white, and having thus completed his toilet, he paid for six *cartes de visite*, and sat for his facsimile. The operator was not a little surprised to see a person, so contrary to usual custom, rendering himself what may be termed a picture of misery; but on entering into conversation with his customer, the operator was informed that the party sitting for his portrait had been requested by his friends, who are in good circumstances at home, to send his portrait both in his digging costume and in his Sunday or gala clothes. During the operation the man pulled a long and miserable face like Small's "Unfortunate Man," and informed the operator that he intended to soften his uncle's heart by enclosing one of the *cartes* with an intimation that he will forward his likeness in his Sunday clothes when he gets them.—*M'Ivor Times.*

Art in the Provinces.—What *is* the meaning of this police case before the Worksop magistrates?—

> "Police-constable Middup charged two gipsies, named *James Smith* and *Elijah Smith*, with having unlawful possession of a pheasant. Evidence not being forthcoming, the Bench decided to dismiss the charge on condition that the two men agreed to have their portraits taken. To this they readily agreed."

Does the Worksop Bench consist of amateur photographers, who cannot prevail on their friends to sit to them, and are they, therefore, glad of any opportunity of exercising their skill? Or were James and Elijah immortalized as the bearers of the new and startling name of Smith? We should like to hear an explanation of the mystery, and are anxious to learn whether the likenesses were mere photographs, or works in oil, or water. And then what size are they? Does a vagrant merely sit for the head and shoulders, while a murderer is drawn at full length? One thing is very evident—that there is more art than justice on the Worksop Bench. For, as there was no evidence against the gipsies, they ought to have been unconditionally dismissed.—*Fun.*

To Correspondents.

D. S. S.—The mode of ventilating of the glass house is really a builder's question, and must depend very much upon the special construction, &c., of each individual studio. For constant ventilation, Moore's patent ventilators might, with advantage, be used; and in many cases it is desirable to have facility for opening some portion of the skylight. For the dark room, louvre ventilators may, with advantage, be employed. As the vapour of ether falls, it is desirable, in a room in which much collodion is used, to have a grating in the floor, underneath which should be space through which a current of air could pass. For ordinary purposes, a lofty dark room, with a window opened on every possible occasion to admit fresh air, will answer very well.

J. B.—We found no example of the albumenized paper in your letter. It is probable, however, that the uneven coating of albumen, of which you complain, arises chiefly from unskilful manipulation, especially if the plain paper be somewhat new. In such case the size becomes partially dissolved by floating on the albumen solution, which permeates some parts and remains on the surface in others, and thus produces the uneven coating. Give the shortest possible floating, merely passing the paper over the albumen surface. The operation should be effected in a room at a temperature of about 70° or 80°, so that the surface may dry quickly. 2. India-rubber dissolved in benzole will answer for keeping the film on dry plates. The plate may be coated with it before applying collodion at all; or the edges may be treated with the solution before development. 3. As a general rule, the immersion of plates which have received a preliminary coating of albumen is found to disorder the bath; but we know some photographers, who use a dilute solution for such coating, who experience no bad results from its use. Some, we know, who use the albumen coating, and find that if it be coagulated with protosulphate of iron, no deterioration of the bath follows. You will find an article giving full particulars of the various modes of applying a preliminary coating, and their results, on page 25 of our sixth volume.

Enquirer.—Lunar caustic will serve for the printing bath, and may be used in just the same proportion as the crystallized nitrate of silver; but we do not see what saving you propose to effect by using it. Commercial samples of crystallized nitrate of silver will be found cheaper.

H. M. D.—The photograph enclosed is very satisfactory. The addition of nitrate of baryta, as proposed, ought not to have produced fog, if it were pure. Did you test the bath to ascertain if it were alkaline?

Kent.—We should prefer No. 1. We can give you fuller advice when we see you. We have seen good stereoscopic negatives enlarged to 12 by 10 without any disadvantage; and if the negative were very perfect and the film very fine, it is probable that a still more extended amplification might be secured without serious loss.

An Operator.—Silk draperies in a photograph are best coloured with transparent colour. A mixture of sepia, indigo, and crimson lake will make a good black; use indigo for the lights, and a little additional lake in the shadows. Cloth fabrics may at times be managed with transparent colours, but they are generally painted in body colour. Mix Chinese white and lampblack to the proper tint for the local colour, adding a little gum water; then use the mixture we have indicated for black silk in the shadows. You will find Newman's shilling "Manual of Harmonious Colouring Applied to Photographs" will give you the necessary information.

P. O.—We have not had sufficient practical experience of the lenses you mention to give a very definite opinion, but should prefer the first mentioned.

An Amateur.—The water you describe as "rich in chlorides" is not well suited for preparing the developer, as it will precipitate the free nitrate on the plate as a chloride instead of leaving it to take its part in forming the image. It may, however, be used for washing waters, toning baths, &c. It is possible that after precipitating the chlorides by means of nitrate of silver, it might be used for making a silver bath. Some printers prefer the addition of salt to the washing waters, before toning; others object, on the score that the prints do not tone so readily. This is the only disadvantage to be considered. Theoretically, it is safer and better thus to get rid entirely of free nitrate before toning or fixing. 2. It is not necessary to wait for forty-eight hours after refreshing an old acetate bath with fresh gold before using it; although it is better not to use the bath immediately after the addition of the gold. 3. The washing away of the free silver from that part of the plate on which the developer is poured, and causing a stain, is generally the result of using a very old or acid developer. Possibly this has been the case in your hands. We have never found the addition of sugar have that effect. See article on a New Intensifier in our next number.

R. M. (Putney).—You will find that the formulæ in the paragraph from *Galignani* appeared in last year's News. Albumen or collodio-albumen dry plates suffer least injury in printing.

W. S.—So far as our experience goes, we should select No. 2 in preference to No. 1; both are, we believe, good makers; but we should have more confidence in every one issued by No. 2 being good. The third maker named makes a lens for the smaller size, which works well with very wide aperture, and is therefore very rapid. Thanks for the kind expression of your opinion. We have had many such friendly notes. The matter, as you conjecture, is quite beneath any notice.

W. Bannister.—Much depends on the size of the condenser, the lens used, the sensitiveness of the paper, and the purity and uninterrupted character of the sunlight. With the solar camera, without reflector and condenser of the usual size (9 inches diameter, and 18 inches focus, we believe). Mr. Stewart, of Glasgow, averages about an hour's exposure. With a very large condenser, like that used by Mr. Mayall, the exposure would probably not be more than half. We have before us a picture, by Mr. Mayall, one of the finest enlargements we have ever seen, which was, we believe, produced direct with an exposure of about eight minutes. The face is nearly six inches long, produced from a whole-plate negative, This picture is quite as perfect as one of the same dimensions would he taken without enlargement. 2. Floating is a more certain mode of securing an even surface than brushing, but not always so convenient or economical. 3. About four grains of gallic acid are soluble in an ounce of water. A few drops of acetic acid should be added, using more in hot weather. It is sometimes desirable to use hot water to dissolve the gallic acid, and allow it to cool before use.

Stereo.—It is most convenient to work with an aperture in the side of the room facing a clear expanse of sky to north. A shelf, on which a piece of white paper or other suitable reflector may be placed at right angles with the negative, is convenient. It is much easier to preserve the proper parallelism between the negative and sensitive plate, &c., working in this way, than when the aperture is made in the roof.

A Reader of the News.—The mercury and iodide may be mixed in one solution, and will form an intensifier without any other addition. The usual plan is to make a solution of the mercury salt, and apply it to the negative, and follow that by an application of a solution of the iodide. The result is deposit of iodide of mercury. The appearance of the negative will vary, according to treatment, from a greenish grey to a yellow. It is a dangerous and troublesome intensifier, except in experienced hands; and the negatives are apt to become denser and harder in course of printing. We do not recommend its use.

A. W. Adams.—We do not know of any sample of albumenized paper being especially suitable for fuming; so far as we know, all are. If you get a blue print, fume a shorter time, or use weaker ammonia.

Jumble.—Stippling with white lead is the most effectual mode of obscuring windows, or with the same with a little blue added, but it is very apt to obstruct a good deal of light. Perhaps nothing is simpler or more effective than covering the glass with sheets of tissue paper.

A. B.—A half-plate lens, if you have length of room, will suit you best in many respects. It will give the best definition. But you will run more risk of being troubled under some circumstances in having a greater body of foggy atmosphere between the lens and sitter. A lens made expressly for card portraiture is best. We have not had sufficient experience with the lenses you name to offer an opinion.

W. R. P. J.—So far as we can judge from the print, the negative has been taken with a newly mixed, simply iodized collodion, which often produces such spots. The addition of a little bromide of cadmium, or allowing it to stand a few days, will probably remove the defect.

C. H. F. (Hull).—We can better form an opinion of the matter after seeing results. Such a thing cannot be protected by registration; a patent would be required, which is costly. We have an impression that such an idea has been patented before; but are not certain.

Saturn.—Two achromatic object glasses are not suitable for the purpose. To make a calculation as to how to produce any result at all, much more data than you have given would be necessary. To cause all the rays which pass through your 3-inch lens to be utilized, the 2-inch lens must be placed about 14 inches (one-third of the focus) from it; but we fear that without more perfect appliances and fuller knowledge you cannot produce an instrument which will be of much service to you.

Young Photo.—The cause of your difficulty is, that at the hour you mention the sun shines direct into your lens. The remedy is to shade the lens more completely. The fact that it does not do so with the other lens you mention is probably due to its being a smaller lens with a longer hood, and possibly, from its focal length, placed in some other part of the room. When the sun is shining directly into a room, the greater body of illuminated atmosphere there is between the lens and sitter the worse will be the result. It will be well to use blinds, during the hours you name, to prevent direct sunlight entering the room. 2. The vignettes with grey grounds have often been described in our pages. After the vignette has been produced in the usual way, cover the printed image with a piece of thick paper, a little smaller than the image, and then expose the white margin to the light, keeping the paper mask moving, so as to prevent it forming a hard edge.

W. Jackson (Malton).—You will find the casket portrait described in a paper read by the inventor before the British Association, at Newcastle-on-Tyne, in 1863; it is published in the Photographic News, vol. vii. p. 427. The principle is very ingenious, and the result exceedingly beautiful. It consists of two small stereoscopic transparencies mounted on the faces of two prisms, which are then cemented so as to form a cube. When this cube is held before the eyes, one image reaches the right eye and the other the left eye, producing a perfect effect of solidity and relief without the aid of a stereoscope. When highly finished, they form most charmingly life-like pictures. The inventor is Mr. Henry Swan, of London.

W. C. J.—In order to state the distance required between lens and sitter, it is necessary to know the exact equivalent focus of the lens, the exact height of the figure, and the exact size of the image to be produced. In the catalogue of the maker only the back focus is stated. From this, however, we glean that No. 4 would be decidedly of too long focus for your room. No. 3 is said to be 12 inches back-focus; assuming the equivalent focus to be 14 inches (and it will probably be more), 28 feet would be required between sitter and lens to produce images 3 inches in height of persons 6 feet in height. It is probable that the No. 2 would answer your purpose best, and would probably answer well. The distance may easily be ascertained with any lens of which you know the equivalent focus: it is a rule-of-three sum; thus, as the size of the image is to focus of the lens, so is the height of the figure to the distance between lens and figure. 2. We have not timed the triple in a glass room for portraiture, but we have seen good results produced by it. The maker can probably give you most information on this point. The new portrait triple works very rapidly.

J. M. (Manchester).—We presume that the patentee is unwilling to grant licences until he can supply materials and full instructions. Arrangements for this are, we understand, in progress, and we hope will be ready shortly. We agree with you, that it is a pity the delay should be necessary.

Anti-Humbug.—Are you not a little unreasonable? The question of charging a sum of money for the prospectus it is not our business to discuss; it is simply a matter between vendor and purchaser; but any one having chosen to make the purchase obtains the details the prospectus is advertised as containing. Much as we regret that the details of M. Lafon de Camarsac's process are kept secret, we cannot admit his process to be merely a "questionable improvement." His enamels are unquestionably the finest things of the kind which have been produced by our art, and are exceedingly beautiful. We shall be delighted if any one in this country will invent a process which will produce anything as good or better; but at present, if we require such work as perfectly done, we must submit to the terms of the artist who alone can do the work, or otherwise forego possessing the results. The sooner some Englishman shall surpass his results, the better we shall be pleased; but remember that art and science are of no country.

H. Taylor.—Thanks for the correction.

Mrs. Watson.—Thanks for the information so kindly sent.

C. Oakeshott.—Thanks for the promised publication, which will doubtless be of great service. If you send it to us, we shall have pleasure in forwarding it to Mr. Carbutt, together with an Archer's Manual of 1852, which we have received for the purpose.

Richard Dighton.—The stamps (5s.) for Howard were duly received and forwarded to the gentleman on the *Standard* who is in communication with him.

F. Powell.—Thanks for the book, which shall be duly forwarded, together with the information in your letter.

John White.—The price of the lens you mention would be, we ascertain, £7.

C. F.—The post office order for 15s. 10d. for Howard, contributed by the assistants in Messrs. Hill and Saunder's establishment, received, and shall be duly forwarded.

Several Correspondents in our next.

An article on a New Intensifying and Toning Agent, together with some other articles in type, are compelled to stand over until our next.

◆

Photographs Registered.

Messrs. Henry Medcalfe and Thomas Evans, Cork,
Photograph of the Rev. Dr. Wall.

Mr. A. L. Garnier, Guernsey,
Four Photographs of George Metivier, Esq., the Guernsey Bard.

*** All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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MESSRS. BULLOCK, BROTHERS', PROCESS OF LITHO-PHOTOGRAPHY.

We have pleasure in announcing that we shall be able to present to our readers, with our next number, a very fine example of this admirable method of "litho-photography," the first process which, by the ordinary printing from a lithographic stone, has promised to render, with due gradation of half-tone, a photograph from nature. The subject selected is a fine landscape. We shall enter into some details and comments on the process and its application in our next.

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A NEW INTENSIFYING AND TONING AGENT.

Photographers are somewhat divided as to the propriety of using intensifying processes. "I consider that the most perfect developer," says one, "which produces exactly the right amount of intensity at the precise moment when the full amount of detail has been brought out, and dispenses with all necessity for intensifying by a secondary process." "I prefer the developer," rejoins another, "which permits the detail to be fully out without conferring much intensity, so that I can, by a second process, secure just the amount of intensity I require, when my sole attention is devoted to that point, undisturbed by the necessity of looking after detail. In fact, I always find that to be the most perfect negative which has received a slight touch of pyro intensifying, just to give brilliancy to the high lights." The first statement of the case appears, at first glance, most plausible, especially on theoretical considerations; but practically, the necessary conditions can rarely ever exist. To secure that the aggregation of deposit necessary to produce intensity, shall be in the exact ratio of the development of detail, demands a perfection of chemical condition, of lighting, and of exposure which could rarely be hoped for; and these, when gained for one subject, would probably have their harmonious balance disturbed when applied to another, containing less or more of contrast in light and shade or colour.

On the whole, we are disposed to think that the best results are obtained when the conditions are such as render a slight amount of intensifying necessary; a fully exposed and harmonious negative, after receiving from such intensifying just that amount of vigour in the minute spots of high light which gives brilliancy to the whole, is, in our estimation, the best. Without entering into a detailed discussion of the subject, however, it will be universally admitted that there are occasions in the practice of every photographer when he *must* intensify, whether he desire it or not. The art is now rich in modes of obtaining density. Where a very slight amount of additional force is required, nothing exceeds the ordinary method with pyrogallic acid and silver; but if much piling up of the image be necessary, delicacy and sharpness are often slightly impaired, and stains and spots are occasionally caused. A large range of effects of intensifying may be secured by the various modes of employing bichloride of mercury; but most of these involve—especially in inexperienced hands—much risk of failure, and of subsequent deterioration in the negative; and are, in our estimation, generally to be condemned. The use of sulphides is generally disagreeable. Iodine is useful in a limited range of cases. Schlippe's salt, as proposed by Mr. Carey Lea, produced excellent effects; but the salt itself was not found in commerce, and it involved two operations, one with mercury or iodine, to prepare the plate, and then the application of the salt itself, to produce a scarlet or brown negative; there was also a risk of the deposit cracking into fissures in drying, and so spoiling the negative. Some other modes of intensifying have been proposed, but not generally practised.

We have to bring a new agent under the attention of our readers, which appears to possess specific advantages which render it well worthy of attention, inasmuch as it is easy to use, very efficient as an intensifier for negatives, and is also a valuable toning agent for transparencies. Some months ago, Mr. Hermann Selle proposed (see Photographic News, p. 367, vol. ix.) an intensifier, to be formed of a solution of cyanide of potassium and iron, and a solution of sulphate of uranium, mixed in equal proportions. As, in the account of it which came under our attention, no formula was given, and the descriptions of the salts themselves were somewhat indefinite, the method did not excite much attention; one or two of our correspondents tried some experiments, but failed in getting good results; and our own engagements at the time prevented examination of the matter on our part. A short time afterwards, Dr. Towler tried some successful experiments, and published a more definite formula, recommending a ten-grain solution of ferridcyanide of potassium, and a ten-grain solution of sulphate of uranium, to be mixed in equal proportions. Again we heard of experiments bring tried with signal failure. We have, however, during the last week or two, tried a series of experiments with the most satisfactory results, and we can now, not only explain how these may be secured, but also the cause of failure in the hands of some of those who have unsuccessfully tried the experiment. We will first state the formula and mode of working. Take

Ferridcyanide of potassium	... 10 grains
Water	... 1 ounce.

Dissolve, and mix with a solution of—

*Per*sulphate of uranium ...	... 10 grains
Water	... 1 ounce.

This mixture is a clear solution of a deep red brown colour; and, poured over a finished and washed negative, it at once changes the deposit (which, after simple iron development, is generally of a greyish colour) into a rich non-actinic chocolate-brown tint, and, if its action be continued, into a purple brown or warm black. This is effected without risk of stains or disadvantage of any kind that we have discovered. There is a remarkable similarity in colour to that produced with Schlippe's salt, but the operation is much simpler, as the negative requires no preparation, and no subsequent treatment beyond washing. The first plate to which we applied the solution was an old glass positive, of bright silvery colour, which had been taken many years. A bright scarlet colour was at once communicated to the whites, which, on drying, became a reddish brown, but very non-actinic in character. Applied to a negative of somewhat insufficient intensity, the tint at once produced was a rich chocolate brown, both by reflected and transmitted light, rendering the negative more non-actinic in colour, without sensibly increasing the deposit, and thus securing an important condition of delicacy as well as intensity, the requisite printing quality being obtained without piling up deposit and risking coarseness.

As a toning agent for transparencies nothing could be better. The rich, deep, warm brown at once assumed, or the deeper purple brown, approaching black, produced by a continued application, appears to us all that can be desired in collodion transparencies for any purpose. The freedom from risk of stain or injury of any kind, so far as our experience has gone, is most valuable. The solution may, if desired, be made stronger, and its deepest effect produced more rapidly if desired; but it appears to us that the strength we have indicated is the best for practical purposes. The solution may also be used over and over again, until its efficacy is exhausted.

The solution of the difficulty, to which we referred at the outset as experienced by some of our correspondents, is due rather to accident than research, without which it could not readily have been predicated, from the comparatively unknown and untried character of the agents employed. Our attention was recently called to the subject by Mr. Williams, of the firm of Hopkin and Williams, who, asking us if we had tried the new intensifying process, mentioned that a gentleman had applied for ferridcyanide of potassium and sulphate of uranium for the purpose. He was supplied; and subsequently, in obtaining a further supply of these salts, reported most favourably of the results. In a few days he returned, and stated that the second supply had produced nothing but failure; and after a little enquiry and examination into the matter, the probable cause of the failure was ascertained. The sulphate of uranium which had first been supplied was the salt usually known under that name, the protosulphate of uranium, or, in more modern phraseology, sulphate of uranyle; but having been some time prepared, it had become peroxydized and converted into the persulphate. The second supply had been more recently prepared, and consisted of the protosulphate. This, on being added to the solution of ferridcyanide, produced immediate decomposition, but no intensifying result followed its application to the negative. It became tolerably clear then that the persulphate of uranium was the proper salt to be used. Mr Williams, who is a most able chemist, was scarcely satisfied with the solution of the matter, as not being based upon reactions which might have been known or anticipated; and we resolved to repeat the experiments. A mixture of the persulphate with the ferridcyanide, according to the formula given above, yielded the excellent results we have described, the solution keeping perfectly until its powers were exhausted. A solution of the protosulphate was then added to the solution of ferridcyanide. An immediate decomposition ensued, throwing down a brown precipitate, but the solution had no colouring or intensifying power whatever, fully confirming the result already arrived at accidentally.

The final result appears to be the conversion of a portion of the silver forming the image into ferridcyanide of silver. The solution of ferridcyanide of potassium alone does not possess the power of effecting this conversion. As various mistakes have been made from the use of the wrong salts, we may briefly describe those required. The ferridcyanide of potassium consists of red transparent rhombic prisms, often encrusted a little with a greenish powder; it is frequently called red prussiate of potash, as distinguishing it from the yellow prussiate of potash, or ferrocyanide of potassium. The persulphate of uranium is a yellow salt, generally in amorphous masses; the protosulphate is a green salt, very highly deliquescent.

It was suggested by Dr. Towler that the solution above described might probably possess some toning power on silver prints; and we made some experiments in that direction. We found it altogether unsuitable for unfixed prints, but when applied to a fixed and washed, but untoned print, we found the red brown tone converted into purple. Whether any advantage would be obtained by its use we cannot at present say.

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MR. DAVIES AND MR. SWAN'S CARBON PATENT.

We invite the attention of our readers to a communication from Mr. Davies, of Edinburgh, in another column, in reference to our article, a fortnight ago, on Mr. Swan's Carbon Patent, and the statements regarding it made at a recent meeting of the Edinburgh Society. We mention it here in order that, in fairness, the explanation of Mr. Davies may obtain the same amount of publicity and attention accorded to our remarks. In adding one or two observations on Mr. Davies's letter, we are glad to be confirmed in the remark we made in our former article. We said:—"We believe that this is simply a mistake: that Mr. Davies had really discovered the method he described, in the course of his own experiments, and, naturally enough, believed it to be wholly his own." We are the more glad to publish the interesting history of the progressive experiments of some years in an important branch of our art, because it is to us always an especial pleasure to render honour to whom is due, and we esteem very highly the persevering, intelligent, and unobtrusive labours of the ardent experimentalists to whom so much of the progress of our art is due.

But Mr. Davies must not lose sight of the purport of our observations made a fortnight ago. Our aim was not to dispute the claims of Mr. Davies to original invention, but to maintain those called in question which belonged to Mr. Swan. Mr. Nicol referred to Mr. Swan as having patented a process long before discovered by Fargier. We showed that there was an essential difference between Mr. Swan's and M. Fargier's methods, and that difference in the essential feature of practicalness. Fargier's method was patented in this country years ago, and, for lack of a practical character, has never been worked; whilst Mr. Swan's is likely to be established on a commercial basis. Mr. Nicol also added, that Mr. Swan had re-discovered "the method *published* by Mr. Davies." Here was his essential error. The method had not been *published* by Mr. Davies until after it was patented by Mr. Swan. We are quite willing to believe, from the statement of Mr. Davies's experiments, that he was familiar with the idea of a transfer process; but until July 6th, 1864, he did not publish his ideas on the subject as applicable to a practical process of carbon printing, a date which was two weeks subsequent to the publication of the process in our pages, and three weeks subsequent to the sealing of Mr. Swan's patent.

And here we have to correct an unfortunate and foolish misprint in our last article on the subject, and which had escaped our notice until now Mr. Davies calls attention to it. Mr. Swan's patent was sealed, according to the official copy which lies before us, on the 14th of June, 1864. By a clerical or typographical error (we cannot say which) this was printed in our recent article as the 14th of September, 1864.[*] The truth is, that the specification was printed in our pages before the latter date. Mr. Davies will see that we are correct in stating that Mr. Swan's patent had been sealed three weeks before the publication of the process he was alleged to have appropriated or re-discovered. So far as securing the priority of publication is concerned, Mr. Davies has been unfortunate, as it seems that he sent a communication to a friend to be read at the London Society when Mr. Swan first announced his process there. This friend, for some reason, doubtless, which at the time seemed satisfactory, forbore to read this letter. From a combination of causes the publication was delayed until July 6th; and thus, whilst we may readily accord to Mr. Davies the credit of independent and original discovery, that of prior publication was lost to him.

One or two words in conclusion.

We can with pleasure compliment Mr. Davies on the general tone of his letter, which, in this respect, is a pleasant exception to many of the controversial letters addressed of late to photographic journals. He has stated interesting facts, instead of indulging in epithet. But there is one allusion to the possible interpretation of which we must take emphatic exception. It is possible that Mr. Davies had no intention of expressing the suggestion which the allusion conveys; we hope he had not; but in his description of the visit of a "gentleman from Newcastle," who wearied him with cross-questioning on the subject of half-tone, and finally obtained and never returned the only copy of his paper on the subject, there is undoubtedly an idea conveyed that this "gentleman from Newcastle" may have been in someway associated with Mr. Swan of Newcastle, and that Mr. Davies's ideas were appropriated possibly for Mr. Swan's benefit. To those who know Mr. Swan, the repudiation of any possibility of his acting in such a way would be absurdly needless. It has been our misfortune to differ somewhat from Mr. Swan in regard to the legal bearing of another patent; but we have no hesitation in expressing our conviction that he is utterly incapable of appropriating without acknowledgment any other man's ideas, or even conniving at such a practice; and we have further reason to believe that before the November of 1863, his ideas, theoretically, were tolerably fully developed on the question of half-tone in carbon printing. We feel considerable embarrassment in making any defence of a gentleman in reference to whom there is no definite charge, but only something which might be construed into an occult allusion, or understood as a possible charge; but we feel we should not be doing the subject justice if we let the matter pass without notice.

We repeat, in conclusion, that whilst awarding all honour to all experimentalists who have contributed to this subject, yet, altogether apart from all origination, Mr. Swan has earned the thanks of photographers and of the world for the practical skill, ingenuity, and perseverance with which he has worked out carbon printing to a practical issue, capable of giving results not to be surpassed in beauty, and unequalled in permanence, by any other photographic printing process. His patent has been in this instance a positive advantage to the photographic community, as it has given him an object in working out his process to perfection; and, unless we are mistaken, it will be found, when his programme is published—which it will, we believe, very shortly—that photographers will not have reason to complain, even in a pecuniary sense, that the process is protected by patent.

ART COPYRIGHT AND MAGIC LANTERNS.

An instructive letter will be found in another column, in which Mr. Highley details a case of considerable hardship to which he has been subjected in connection with the copyright law. The reproduction of book illustrations has been common for the purpose of magic lantern slides; everybody is familiar with them in some form. Bible illustrations, natural history, humorous subjects—such as "Reynard the Fox"—have generally contributed to the amusement of an evening with the magic lantern. The reproduction of engravings of this kind, and exhibiting them in this way, have generally been regarded as a good and cheap advertisement for the proprietors of the copyright. Mr. Highley, as producer of and dealer in magic lantern slides by photography, accustomed to this view of the case, recently copied the illustrations in a certain work; and, with no thought of harm, invited the artist, whose design he had reproduced, to see them on the screen. Shortly after this he had an application for the set of sixteen slides, and sold the only set he had produced.

To his horror and surprise, he was served, a few days afterwards, with that formidable looking document, a Bill of Complaint in Chancery. The slides sold were, it appears, bought by the agent of the owner of the copyright (who was not the artist), with an express view to legal proceedings. When the case was heard, Mr. Highley submitted to an injunction, pleading, of course, the absence of fraudulent intent, the custom of the trade, &c. Without entering into details, we may state, in brief, that he had to pay all costs, which, in the lightest form, become a very heavy penalty for a very light offence.

Strictly speaking, there is no doubt that Mr. Highley had infringed the copyright. The Act strictly prohibits copying "for exhibition" as well as for sale; and the owner of a copyright has the power, undoubtedly, of determining whether that copyright shall be infringed even for the purpose of affording him a gratuitous advertisement. If he be sufficiently short-sighted or blind to his own interest, the loss is chiefly his. He is like the churl who, having no shutters to his windows, resolved to sit in darkness, lest the street should be partially benefited by his light. It was surely the height of churlishness to proceed without warning, and the height of short-sighted folly not to afford any opportunity for compensation or compromise, which probably might have been effected satisfactorily to both sides for a third or a fourth of the costs of a suit in Chancery.

The moral for our readers is, however, to avoid reproducing copyright designs, for any purpose whatever, without the permission in writing of the owners of such copyrights. The Law, which an able jurist has said to be the perfection of human wisdom, seems not to look favourably upon photography. If any one infringe the undoubted copyright of a photographer, he generally escapes Scot free, the audacious copyright holder being frequently snubbed for his desire to protect his property; but if a photographer infringe an art copyright, there are no terms for him; and if he escape with a payment of thirty or forty pounds for an unconscious and unintentional offence, he must regard himself as very fortunate. By all means let photographers avoid transgressing the law, and let them especially beware of coming within the precincts of a Court of Equity.

RAMBLES AMONG THE STUDIOS OF AMERICA.—NEW YORK.

BY J. WERGE.

What a wonderful place New York is for photographic galleries! Their number is legion, and their size is mammoth. Everything is "mammoth." Their "saloons" are mammoth. Their "skylights" are mammoth. Their "tubes," or lenses, are mammoth. Their "boxes," or cameras, are mammoth; and *mammoth* is the amount of business that is done in some of those "galleries." The "stores" of the dealers in photographic "stock" are mammoth; and the most mammoth of all is the "store" of Messrs. E. & H. T. Anthony, on Broadway. This establishment is one of the many palaces of commerce on that splendid thoroughfare. The building is of iron, tall and graceful, of the Corinthian order, with Corinthian pilasters, pillars, and capitals. It is five stories high, with a frontage of about thirty feet, and a depth of two hundred feet, running right through the "block" from Broadway to the next street on the west side of it. This is the largest store of the kind in New York; I think I may safely say, in either of the two continents, east or west, containing a stock of all sorts of photographic goods, from "sixpenny slides" to "mammoth tubes," varying in aggregate value from one hundred-and-fifty thousand to two hundred thousand dollars. The heads of the firm are most enterprising, one taking the direction of the commercial department, and the other the scientific and experimental. Nearly all novelties in apparatus and photographic requisites pass through this house into the hands of our American *confrères* of the camera, and not unfrequently find their way to the realms of Queen Victoria on both sides of the Atlantic.

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[*] The actual dates are as follows:—The first entry of the patent is dated February 29th, 1864; it was sealed June 14th, 1864; and accessible to the public, August 27th, 1864.

The largest of all the large galleries on Broadway is that of Messrs. Fredericks & Co., and, as the ordinary galleries are generally called mammoth, this, for variety, ought to be designated "bi-mammoth." The whole of the ground and first-floors are thrown into one "crystal front," and make a very attractive and showy appearance. The shop windows are filled with life-sized portraits painted in oil, crayon, and other styles. The walls of the interior are lined with life-sized pictures of eminent men. The floor is richly carpeted, and the furnishing superb. A gallery runs round the walls to enable the visitors to view the upper pictures and obtain a general view of the saloon, the *tout ensemble* of which is magnificent. From the ground-floor an elegant staircase springs, leading to the galleries, toilet, and waiting rooms, thence to the "operating rooms," or studios. This gallery was "enlarged" and re-opened in 1860.

The first gallery of this description, making such an attractive show on the street, was opened by Mr. Anson several years before, right opposite the Metropolitan Hotel, and was quite a success. Mr. Anson made his business popular, in the Daguerreotype days, by giving a "large size" picture for fifty cents (two shillings sterling). For this small sum a first-class sixth-size Daguerreotype in a good case was given. Afterwards, Mr. Anson continued and increased the popularity of his establishment by giving life-sized photographs coloured in oil at the back, and which he called Diaphanotypes, and gave them, framed and all complete, for fifty dollars. Mr. Anson seems to have had the knack of sticking to "fifties," and making the "fifties" stick to himself, for I learn that he has since retired with an ample fortune.

Messrs. Gurney and Son's gallery, also on Broadway, is a very fine one, but not on the ground-floor. They have a show window on the street. Their "saloon" is up-stairs. This house is one of the oldest in connexion with photography in New York. In the early days of the Daguerreotype, Mr. Gurney, senr., was one of the most eminent "professors," and was one of the committee that waited upon the late Mr. Hill to negotiate with that gentleman for his vaunted secret of photography in natural colours. As the art advanced, Mr. Gurney was ready to introduce every novelty, and in later years, in conjunction with Mr. Fredericks, then in partnership with Mr. Gurney, he introduced the "Hallotype" process, and afterwards the "Ivorytype," or wax process. Both these processes had their day. The former was photography spoiled by the application of transparent varnish or Canada balsam and very little art, and the latter entailed a great deal of art labour on the surface of the photograph. Many of their Ivorytypes were extremely beautiful and transparent as coloured photographs, but they had the disadvantage of being *attached* to the glass before them by means of white wax and gum dammar.

Mr. Brady, who has an elegant gallery on the corner of Tenth Street and Broadway, is also one of the oldest landmarks of photography in the city of New York. He commenced the Daguerreotype business in Fulton Street, low down Broadway, many years ago. As the sea of commerce pressed on and rolled over the strand of fashion, Mr. Brady was obliged to move his "lighthouse" higher and higher up Broadway, until he reached his present "location," miles above where he first began. Mr. Brady seems to have set the Franklin maxim of "three removes as bad as a fire" at defiance, for he has made three or four removes to my knowledge, each one higher and higher up Broadway, and to more elegant, commodious, and expensive premises, each remove entailing the cost of more and more magnificent furnishing, until his last essay in upholstery culminated in a superb suite of black walnut and green silk velvet; in short, Longfellow's "Excelsior" seems to be the motto of Mr. Brady.

Messrs. Mead, S. Root, Cady, Adams, Glosser, and others ought to recieve "honourable mention" in connection with the art in New York; for they were excellent operators in the Daguerreotype days, and many of them are quite as successful photographers at the present time.

When the cartes de visite pictures were introduced, the oldest and largest houses held aloof from them, and only reluctantly, and under pressure, took hold of them at last. Why, it is difficult to say, unless their very small size was too violent a contrast to the mammoth pictures they were accustomed to. Messrs. Rockwood & Co., of Broadway, were the first to make a great feature of the cartes de visite in New York. They also introduced the "Funnygraph," but the latter had a very short life.

In the Daguerreotype days there was a "portrait factory" on Broadway, where likenesses were turned out as fast as coining, for the small charge of twenty-five cents a head. The arrangements for such rapid work were very complete. I had a dollar's worth of these "factory" portraits. At the desk I paid my money, and received four tickets, which entitled me to as many sittings when my turn came. I was shown into a waiting room crowded with people. The customers were seated on forms placed round the room, sidling their way to the entrance of the operating room, and answering the cry of "the next" in much the same manner that people do at our public baths. I being "the next," at last went into the operating room, where I found the operator stationed at the camera which he never left all day long, except occasionally to adjust a stupid sitter. He told the next to "Sit down" and "Look thar," focussed, and, putting his hand into a hole in the wall which communicated with the "coating room," he found a dark slide ready filled with a sensitized plate, and putting it into the camera, "exposed," and saying "that will dew," took the dark slide out of the camera, and shoved it through another hole in the wall communicating with the mercury or developing room. This was repeated as many times as I wanted sittings, which he knew by the number of tickets I had given to a boy in the room, whose duty it was to look out for "the next," and collect the tickets. The operator had nothing to do with the preparation of the plates, developing, fixing, or finishing of the picture. He was responsible only for the "pose" and "time," the "developer" checking and correcting the latter occasionally by crying out "Short" or "Long" as the case might be. Having had my number of "sittings," I was requested to leave the operating room by another door which opened into a passage that led me to the "delivery desk" where, in a few minutes, I got all my four portraits fitted up in "matt, glass, and preserver,"—the pictures having been passed from the developing room to the "gilding," room thence to the "fitting room" and the "delivery desk," where I received them. Thus they were all finished and carried away without the camera operator ever having seen them. Three of the four portraits were as fine Daguerreotypes as could be produced anywhere. Ambrotypes, or "Daguerreotypes on glass," as some called them, were afterwards produced in much the same manufacturing manner.

There were many other galleries on Broadway; Canal Street; the Bowery; the Avenues 1, 2 and 3; A, B, and C, Water Street; Hudson Street, by the shipping, &c., the proprietors of which conducted their business in the style most suited to their "location" and the class of customers they had to deal with; but in no case was there any attempt at that "old clothesman"—that "Petticoat-Lane"—style of touting and dragging customers in by the collar. All sorts of legitimate modes of advertising were resorted to—flags flying out at windows and from the roofs of houses; handsome show cases at the doors; glowing advertisements in the newspapers, in prose and verse; circulars freely distributed among the hotels, &c.; but none of that "have your picture taken," annoying, and disreputable style adopted by the cheap and common establishments in London.

Unhappily, "Sunday trading" is practised more extensively in New York than in London. Nearly all but the most respectable galleries are open on Sundays, and evidently do a thriving trade. The authorities endeavoured to stop it frequently, by summoning parties and inflicting fines, but it was no use. The fines were paid, and Sunday photography continued.

The "glass houses" of America differ entirely from what we understand by the name here; indeed, I never saw such a thing there, either by chance, accident, or design—for Chance has no "glass houses" in America, only an agency; there are no accidental glass houses; and the operating rooms built by design are not "glass houses" at all.

The majority of the houses in New York and other American cities are built with nearly flat roofs, and many of them with lessening stories from front to back, resembling a flight of two or three steps. In one of these roofs, according to circumstances, a large "skylight" is fixed, and pitched usually at an angle of 45°, and the rooms, as a rule, are large enough to allow the sitter to be placed anywhere within the radius of the light, so that any effect or any view of the face can easily be obtained.

The light is not any more actinic there than here in good weather, but they have a very great deal more light of a good quality *all the year round* than we have.

The operators work generally with a highly bromized collodion, which, as a rule, they make themselves, but not throughout. They buy the gun-cotton of some good maker—Mr. Tomlinson, agent for Mr. Cutting, generally supplied the best—then dissolve, iodize, and bromize to suit their working.

Pyrogallic acid as an intensifier is very little used by the American operators, so little that it is not kept in stock by the dealers. Requiring some once, I had quite a hunt for it, but found some at last, stowed away as "Not Wanted," in Messrs. Anthony's store. The general intensifier is what they laconically call "sulph," which is sulphuret of potassium in a very dilute solution, either flowed over the plate or the plate is immersed in a dipping bath, after fixing, which is by far the *pleasantest* way to employ the "sulph solution." Throwing it about as some of them do is anything but agreeable. In such cases "sulph" was the first thing that saluted my olfactories on putting my head inside one of their "dark rooms."

Up to 1860 the American photographic prints were all on plain paper, and obtained by the ammonia-nitrate of silver bath, and toned and fixed with the hyposulphite of soda and gold. The introduction of the cartes de visite forced the operators to make use of albumenized paper; but even then they seemed determined to adhere to the ammonia process if possible, for they commenced all sorts of experiments with that volatile accelerator, both wet and dry, some by adding ammonia and ether to an 80-grain silver bath, others by fuming, and toning with an acetate and gold bath, and fixing with hypo afterwards.

With the following "musings" on "wrappers" (not "spirit rappers," nor railway wrappers, but "cartes de visite wrappers") I shall conclude my rambles among the galleries of New York. Wrappers generally afford an excellent opportunity for ornamental display. Many of the wrappers of our magazines are elegantly and artistically ornamented. Nearly every pack of playing cards is done up in a beautiful wrapper. The French have given their attention to the subject of "carte de visite wrappers," and turned out a few unique patterns, which, however, never came much into use in this country. The Americans, more alive to fanciful and tasteful objects of ornamentation, and close imitators of the French in these matters, have made more use of cartes de visite wrappers than we have. Many wrappers of an artistic and literary character are used by the photographers in America; some with ornamental designs; some with the address of the houses tastefully executed; others with poetical effusions, in which the cartes de visite are neatly wrapped up and handed over to the sitter.

Surely a useful suggestion is here given, for wrappers are useful things in their way, and, if made up tastefully, would attract attention to the photographic establishments that issue them. Photography is so closely allied to art that it is desirable to have everything in connexion with it of an elegant and artistic description. The plain paper envelopes—gummed up at the ends, and difficult to get open again—are very inartistic, and anything but suitable to envelope such pretty little pictures as cartes de visite. Let photography encourage art and art manufactures, and art will enter into a treaty of reciprocity for their mutual advancement.

TONING WITH GOLD AND CARBONATE OF MAGNESIA.

BY EDWARD SEELEY.*

Though silver prints may soon become things of the past, as they seem to be present necessities a new toning bath may not be quite unwelcome.

The qualities required of a toning bath are, that it should produce prints of good *quality*, in good *quantity* in proportion to the gold employed, with *rapidity* and *certainty*.

With the acetate of soda bath the quality is good, with moderate certainty, but the toning rather slow, and half gold used is wasted. Of chloride of lime much the same may be said, though perhaps there may be less certainty. I cannot understand why a *chloride* should be added to the gold; surely some other compound of lime would be better. Carbonate of soda will tone a greater quantity than either of the foregoing, with more rapidity, about equal quality, but more uncertainty; and being so strong an alkali, often spoils the surface of the print. Carbonate of magnesia, which I wish to introduce to your notice, has been used by us for some months, and has given a better quality, with nearly the rapidity of carbonate of soda, with more certainty, and much greater quantity. Of course much will depend on the paper, which, if not good, cannot be well toned by any process. We use *Saxe*, rather highly albumenized, with about five grains of chloride, a mixture of ammonium, with a little barium. Our silver bath has varied between 30 and 50 grains per ounce. With the weaker bath, in cold weather, toning has sometimes been rather difficult. The chloride of gold I made myself, that I might be certain of the quantity of metal used. I have sometimes neutralized it with carbonate of soda, and sometimes by repeated evaporation, and by chalk; usually the latter. In the following quantities the grain is calculated from the quantity of gold used, by the equivalent of the usual hydrochlorate of the terchloride, though usually the weight was less, the chlorine having been partly driven off. We rarely fail in toning at least five sheets of the full size with one grain of chloride of gold; we usually tone six, and sometimes seven. The accompanying specimens will show that the colour obtained is as black, if not blacker, than is usually obtained with much more gold.

In the last Photographic News Almanac a "Photographer's Assistant" says of ordinary toning: "The first pictures are unmercifully pitched into by chlorine, and are thus injured; the last escape chlorine, and lose their share of gold at the same time. Hence the range of colours commences in gray and ends in brown." With the magnesia bath as we use it, if everything is right, six sheets per grain of chloride of gold may be toned, without either gray or brown. With a more highly salted paper, possibly blacks would be obtained still more easily, though not in greater quantity; the maker of ours thought we should not be able to tone it black at all. Carbonate of magnesia is very slightly soluble, 50 ounces of distilled water at 45° not quite dissolving one grain; at 80° solution of this quantity is more perfect, but not complete; and this solution is alkaline to test-paper. Most samples of carbonate of magnesia contain a trace of sulphate, which may be injurious.

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* Read before the North London Photographic Association, April 4th.

The toning bath is usually prepared by adding 3 grains of gold to 70 or 80 ounces of a decanted clear solution of magnesia. It is ready for use the next day, and after a week slowly loses its power. Not having kept a bath more than three weeks, I cannot say when it would quite fail. We tone over hot water (the hotter the quicker), and never use a bath twice. If the exciting bath is slightly acid with nitric acid, the toning is blackest and in greatest quantity; if slightly alkaline, the tone is warmer, but tones a less number of sheets for each grain of gold used. When using the carbonate magnesia toning bath, the prints *must not be thoroughly washed before toning*, as a *slight trace* of free nitrate of silver left in the prints adds much to the facility of toning.

The following causes of failure have been noticed:—

1st. Bad paper.

2nd. Weak silver bath (carbonate of soda will tone rapidly prints from a weak bath that magnesia would hardly touch).

3rd. Toning bath neutral or acid, from acid gold having been used. A piece of test-paper should be put into the bottle when mixed, and if it does not the next day show decided alkalinity, more magnesia must be added, and the bath kept a day longer.

4th. The gold carried down by much *excess* of magnesia, when that is added in powder instead of using a decanted solution.

5th. Bath too cold, giving poor tones, and that slowly; or too hot, toning irregularly.

6th. Bad water used for making the bath. At one time we used spring water with a large quantity of free carbonic acid, which gave a neutral solution, unless first exposed to the air for some time. Now our water contains carbonate of lime dissolved in carbonic acid, which makes it alkaline, and requires neutralizing with hydrochloric acid, then adding the gold and a slight excess of magnesia in powder; or, better still, get rid of the free carbonic acid by a small quantity of lime, then filter or decant, neutralize, &c. Carbonate of magnesia is thrown down by lime, and water containing much carbonate of lime seems to dissolve no magnesia; but will without addition make a toning bath, giving about four sheets per grain of gold, but not satisfactorily, making poor and rather mealy pictures, which lose in fixing. Possibly many toning difficulties might be traced to the water used.

I am now experimenting with other salts of magnesia. The acetate is rather promising, doing as well, if not better, than the carbonate. It is easier to use, being more soluble, but rather difficult to prepare.

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QUICK WORKING.—DEVELOPERS, &c.

BY WM. A. TERRY.*

Seeing in the journal complaints of slow work, has brought to mind my experience in the use of old camera tubes which had been used in Daguerreotyping, which may possibly be of service to some. When I commenced operating, I had five one-quarter and one-half size tubes of Voigtlænder and Son's make, which the former owner assured me were all first-rate instruments, but which showed a great difference in the time of working; some of these tubes would take a picture in about one-third the time required by others. Having some knowledge of optical instruments, it appeared to me unreasonable to suppose that there could be originally so much variation in instruments of the same make, consequently I went to work to discover the reason. In two cases the cause was apparent on slight examination; in one, the lenses, cemented together with balsam of fir, were partially separated, a film of air being interposed between them in some places, while in others they were still in contact; in another tube, the two lenses, separated about one-sixteenth of an inch by a rim of metal, were covered on the inside surface with a white fog, apparently mercury; on removing this the instrument worked as quick as any, but I found it necessary, as long as I used the camera, to take out and cleanse the lenses as often as once a week. Another tube, the worst of the lot, appeared to be all right, but I recollected that in some experiments with Canada balsam as a varnish for pictures, it turned yellow after a short exposure, and, on examining the lenses cemented with this substance I found the difficulty; on looking through edgeways, the brownish yellow colour of the balsam between the lenses was very apparent. After separating and thoroughly cleansing the lenses, I found I had reduced the time of exposure from 40 to 60 seconds, which had been before necessary, to from three to five, a vast difference; in fact, the yellow balsam had been equivalent to a thin plate of yellow glass between the lenses. Balsam of fir is an article which should never be used for such purposes, or for pictures, as it is certain to turn yellow in time, generally very soon after it becomes solid. In most cases I think that slow work is the fault of the chemicals; an old bath is apt to work slow, particularly if poor and old collodion is used; a bath which has been doctored is almost certain to be slow; a foggy bath is generally the consequence of slovenly operating. I have known operators who would always work a bath into a fog in less than a week; clean hands as well as a pure heart are indispensable.

With a good light and good chemicals an operator should be able to make a positive in three to five seconds, and a negative in from eight to fifteen. With a bath made up two years ago last September, and used constantly since that time, without any addition except the necessary replenishing, I have made negatives the past winter in from twelve to twenty seconds, and with the glycerine developer in from eight to twelve. My light is ten feet square, and about fifteen feet from the floor. I have succeeded in producing negatives with saponaceous compounds and glycerine in the developer, with much less exposure than was possible with the ordinary developer. Commercial glycerine may be purified from chlorides sufficiently for practical purposes by either nitrate of silver or acetate of lead. I prefer the lead, as being less expensive and less troublesome in excess. Dissolve one ounce of glycerine in four ounces of water; sixty grains acetate of lead in four ounces of water; one and a half or two ounces protosulphate of iron in eight ounces water. Now mix the glycerine with the lead; chloride of lead will slowly precipitate; add the iron, and the excess of lead will be thrown down as sulphate. Now add ammonia cautiously until the solution becomes slightly muddy from precipitated hydrate of protoxide of iron; let it stand a few minutes until the colour changes to the dark green of higher oxidation, then clear up carefully with acetic acid; a precipitate of organic matter now falls down, leaving the solution a little soapy and opalescent. By repeating the operation of the ammonia and acid, the solution may be made perfectly clear, but I do not know as this is necessary or advisable. After the solution has settled sufficiently, add to any common developer in good working order and moderately strong—the older the better—about one-quarter to one half its volume of this glycerine solution; let it stand until settled, decant, and try it; should it precipitate silver so as to become muddy while developing, either add more common developer or albumen. Gelatine may sometimes be useful in restraining the precipitation; white sugar and honey also sometimes produce a marked effect. Should it develop too slow, add more iron. When finally corrected for use, it should contain as much glycerine solution as possible without producing loss by precipitation, or unequal development by refusing to incorporate with the solution on the plate. This developer will work much better after standing a day or two. The process I have here given is necessarily very crude and imperfect; I have been unable to give more definite instructions in consequence of a discrepancy in the results produced by different samples of glycerine. In my first experiments I noticed the exquisite softness given to the image by the use of glycerine; it was, however, very unmanageable, developing unequally. Sometimes the edges of the plate would be first acted upon, and the middle left weak and thin; and again the plate would be entirely unacted upon for about a minute, when the action would commence at a point or points, and spread rapidly over the plate with such violence that the image would be fogged and obscured; and again in attempting to use it, after neutralizing with ammonia without free acid, I found it attacked the film with such violence that the iodide was entirely reduced, without any regard to the previous action of light, the reduction commencing generally at an edge or corner of the plate, and spreading rapidly over the entire surface; and when the action was suddenly stopped by copious washing, the reduced portions appeared black as charcoal, while the advancing edge was of a blood-red colour by transmitted light. A very small proportion of this solution added to common developer produced a very marked effect; I have not succeeded in producing this result in one or two subsequent trials, and have not yet discovered the reason. Besides the remarkable softness of the image produced by the glycerine developer, I soon perceived that the details were more perfectly rendered, and with a much shorter exposure. I could produce as well developed an image in eight seconds as with the common developer in twelve. The character of the deposit is well shown by the action upon it of the bichloride of mercury, a weak solution of which would affect the common deposit very slowly, whitening the glycerine image in a few seconds; also, where the solution overflows, it produces a black deposit on the underside of the plate instead of a metallic one like the common developer. The intensity of the image depends on the management; as I have used it, the image has been slightly more intense than that produced by other developers, but not sufficiently so to print well without a little strengthening, although in out-door views which I have taken with an exposure of about one-quarter of a second fixed in strong cyanide solution without any strengthening whatever, the negative is so intense as to require about ten minutes to print, where my ordinary strengthened negatives print in from three to five. In fact, this developer has proved so satisfactory, that I have used it exclusively for some time past for negatives, and combined with albumen for positives. I think the albumen very useful for positives when rightly managed, as it prevents that chalky appearance of the lights so apt to be troublesome when making positives with negative chemicals.

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* *American Journal of Photography.*

I think Mr. Gates is in error about the keeping qualities of albumen developer. I have some which has been made up several months, and shows no signs of decomposition, and I should suppose the albumen would keep better in the developer than out, on account of the anti-septic properties of the iron. Albumen prepared for coating plates will keep very well by adding a small proportion of ammonia: the ammonia evaporates on drying the plate.

I would say to those who are discouraged by the failure of experiments, study to understand the principle involved, and do not be too much tied up to formulas. The man who has blundered into success to-day, may be in a worse fog than you are to-morrow; and whoever, by patient and persevering experiment, with an intelligent appreciation of facts, seeks to elucidate a principle or make discoveries, will always achieve something. The man who thinks that our present processes are perfect, and that the past has left us nothing to discover in the future, will yet find, if he lives long enough, that "there are more things in heaven and earth than are dreamed of in his philosophy."

The principle of development is, as yet, but little understood. Generally, it is often described as a precipitation of silver upon a sensitive film, and that the precipitate attaches itself to those parts of the film that have been acted upon by light. The chief fault I find with this description is that it is not true; in a true development there is no precipitation of silver whatever; it is simply a growth or deposit of silver, more or less crystalline, in which the silver is brought and deposited upon any surface prepared to receive it, by galvanic currents set in motion by the changes produced by the chemical affinities of the re-agents employed, and which is kept up just as long, and no longer, than the agents continue to react upon each other. The same is true, though to a less extent, and is affected in a somewhat different manner, of the deposit of gold in the toning bath on a print. Were this not the case, the print would receive only the gold from that portion of the solution in actual contact with it; whereas it is well known that a print fastened at the bottom of a toning bath containing just enough gold to tone that print, will deprive the solution in time of all the gold that can be taken from it by a print. No change can take place in a liquid, and more especially a change which affects the density, like a change from the solid to the liquid, or from the liquid to the gaseous form, without a disturbance of the electrical equilibrium. Witness the great increase of power in a Grove's battery, by the decomposition of the nitric acid by the hydrogen, and also notice the convulsions of the dressed legs of a frog, caused by the currents set in motion in dissolving the salt. In the development of an image only a small portion of the silver is deposited. This is easily proved: take a sensitized plate and expose it to a flash of sunlight; now develop, and you get a deposit of silver over the whole surface of the plate, far exceeding in intensity the highest lights of your image. Again, in re-developing, take two plates, one with a well-developed and intense image, the other weak and thin; flow them with the same solution of silver, and re-develop with the same developer—the iron solution I refer to—and you will get as much more silver deposited on the most intense image, as its previous amount exceeded that of the other, thus proving conclusively that the surface that receives the silver has as much to do with its deposit as the re-agents themselves. I think it will be admitted by all who have studied the subject, that the deposit of silver by a developer is very similar, and governed by similar laws, to the deposit by a galvanic battery. This being understood, it is easy to trace the cause of failure in many promising experiments. If the power of the battery is too great for the strength of the solution, or the amount of surface to receive the silver, the silver will not be deposited, but will rather be precipitated upon it in the form of a black, non-coherent powder; and if the liquid be not a good conductor, or the compound formed be not readily soluble, failure also ensues. So in developing, if the action be too violent, and not restrained by some agent which shall at the same time act as a conductor for the galvanic current, and, so to speak, as a flux for the silver, the silver will be precipitated in the solution, instead of being deposited upon the image, and, as in the infancy of galvanism, acid solutions, and acid salts, particularly sulphates, were found most available, so in developing, acid is our main reliance to control the action of the developer; and as in galvanism, alkaline salts are found to be much the best, so in developing I am in hopes that some restraining agent may be found which will act as a conductor in an alkaline solution, and so realize our hopes of instantaneous pictures, and any desirable amount of intensity. Acid in a developer actually destroys the finer details of the latent image before the silver can be deposited upon them. There are many salts beside the proto-sulphate of iron, which I hope will soon be made available, and other salts than the nitrate of silver for the bath. The proto salts of tin have been little noticed, and the nitrate of silver, I think, promises more than has yet been done with it; it is very sensitive to light, and although ungovernable by the ordinary methods, I think it might be easily reduced to order. An alkaline protosalt of iron is wanted which shall be freely soluble. The nearest approach to it I am familiar with, are the soaps formed with fat acids. Why cannot silver be deposited from some other salt than an oxide—say from solution of its chloride or cyanide—by some perhaps hitherto untried re-agent?

I find I have rambled over a good deal of ground, and perhaps your readers will think have written more fancies than facts, but I have desired to set men to thinking as well as experimenting. I believe in the power of meditation—the facts I may give at some future day. I have slightly touched upon the theory, and given mere hints upon other things, because the re-actions were somewhat complicated, and I have not yet separated the conditions which were essential to success from those which were superfluous.

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NEW PHOTOGRAPHIC PRINTING PROCESS.

We (*Scientific American*) have received from the inventors, Messrs. G. E. Desbrats and W. A. Leggo, of Quebec, C.E., some specimens of prints—done upon a common hand-printing press—of their newly-patented process for making printing plates by means of the photograph.

The object of the patentees is to produce electrotype plates of pictures, ready for common printing, like ordinary type printing, without engraving or other hand work.

The process is briefly as follows:—Upon the varnished side of an ordinary negative pour a solution of gelatine containing bichromate of potash. Dry, and expose the uncoated surface uppermost to light, which fixes that portion of the bichromate upon which the rays fall. Dissolve off the unfixed portion by dipping in warm water; drain, and we have a film upon the glass more or less raised, according to the strength of the lights in the picture. Take an impression of this film in plaster. Dip the impressed plaster in hot wax, and place the waxed surface upon a glass plate, also covered with hot wax. The wax upon the plate unites with the wax upon the plaster, and the latter may then be removed, leaving upon the plate a *fac simile* in wax of the original photographic gelatine film.

The *fac simile* being now dusted with plumbago and electrotyped in the usual manner, a printing block in copper is produced, capable of use with printer's ink upon any press.

The specimens we have received are for the most part copies of steel plate engravings, and the pictures are comparatively well done. There is, however, room for improvement.

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Proceedings of Societies.

North London Photographic Association.

The usual Monthly Meeting of this Association was held on the evening of Wednesday, April 4th, Mr. Hislop, F.R.A.S., in the chair.

The minutes of a preceding meeting having been read and confirmed, Mr. J. R. Johnson was elected a member of the Society.

Mr. G. Wharton Simpson exhibited a series of photo-lithographs with fine half-tone, by Messrs. Bullock Brothers, of Leamington, which excited much interest and admiration.

Mr. Ackland read a communication from Mr. Seeley on the "Use of a Toning Bath containing Chloride of Gold and Carbonate of Magnesia" (see p. 173). He exhibited at the same time a number of specimens, varying from purple brown to black, toned by the bath in question; and pointed out the remarkable fact that of those with the blackest tones the largest number could be toned with a given amount of gold, as much as eight sheets of paper being toned to a black tint with one grain of chloride of gold. He also mentioned that a sample of paper which, with other toning baths, gave mealy prints, when toned in this bath was entirely free from mealiness.

Mr. Simpson remarked that the number of sheets mentioned as toned by this solution he believed unprecedented. With the ordinary toning baths, from two to three sheets was considered a large amount of toning to secure from one grain of chloride of gold. He doubted whether eight sheets had ever before been toned with the same amount of gold. The circumstance mentioned by Mr. Ackland, that the blackest tones were obtained when the bath was in the condition to yield the largest number of prints, was an interesting confirmation of a view he had before entertained; namely, that varieties in colour and quality of toning was due rather to the condition of the gold than to the quantity deposited, the degree of subdivision and consequent size of the molecules probably regulating colour.

Mr. Hooper asked whether, in the statements made, a grain of metallic gold or of chloride of gold was to be understood.

Mr. Ackland said a grain of chloride of gold was meant. In answer to another question, Mr. Ackland said he saw reason to believe that the question of permanency would be affected by this mode of toning.

After some further conversation on the quality of the prints exhibited,

Mr. Cartland remarked that the economy of a bath like this was doubtless important in a commercial point of view; but he hoped the primary aim of photographers would always be to enquire first if greater excellence were attainable rather than greater cheapness in the products of their art.

Mr. Hart remarked that, theoretically, the quantity of gold was quite sufficient to tone the number of sheets named, if the process were sufficiently perfect to utilize all the gold in the solution.

After some further conversation and a vote of thanks to Mr. Seeley and Mr. Ackland,

Mr. Hart exhibited and described his Economical Filter and Percolator, demonstrating practically its simple, efficient, and rapid working. We shall probably give a detailed description of this useful piece of apparatus in our next.

The Chairman stated that he had been using Mr. Hart's filter for some time, and was delighted with its extreme convenience. It was one of the most convenient things ever introduced into the dark room. There was no trouble it; it in using was ready for use at a moment's notice; the bath was kept clear, and a great saving effected, as the frequent use of ordinary filtering papers necessarily involved waste. He had great pleasure in testifying to its rapidity, convenience, and efficiency.

Mr. Simpson fully confirmed the Chairman's remarks from his own experience.

Mr. Moens said that the convenience of filtration and changing solutions from bottle to bath without waste or spilling would be of enormous importance to the photographic tourist.

Mr. Hart, in answer to some questions, remarked that the filtering material was a very pure felt; and that after some months of use he had not had occasion to clean out the vessel or change the filtering material, although that could be easily done when necessary. Especial care had been taken to use pure materials, which would have no action on the nitrate bath, whether for collodion plates or paper.

After a vote of thanks to Mr. Hart,

The Chairman called attention to an enlargement of a group on canvas, by Mr. Palmer, exhibited by Messrs. Ottewill, Collis, and Co.

Presentation to Mr. Barnett.

The Chairman then rose and said members would remember that at the last meeting a resolution was passed to the effect that a presentation should be made to their esteemed Secretary, Mr. Barnett, of some testimonial of the esteem in which the Society held him and his services. This resolution had been acted on, and they had on the table before them the testimonial in question. He would not spoil the effect of the gift by any words of his. All the members knew how much the Society was indebted to the courtesy, good will, and unremitting services of their Secretary, although, perhaps, few knew the full extent of the labour involved in such duties. This offering to Mr. Barnett would be some slight expression of the appreciation of the Society of their regard for him as a friend as well as an officer of the Society. He hoped the Society would long have the advantage of the services and urbanity which had made their intercourse so pleasant, and that the testimonial would long remind Mr. Barnett of the esteem in which he was held by the Society.

Mr. Barnett expressed his deep feeling of the honour to himself, and of his appreciation of the kindly feelings in the members in so recognizing such services as he had been able to render. He would cherish the remembrance of it as amongst the most pleasant circumstances of his life, and hoped he might long be able satisfactorily to continue those services of which they had expressed such high regard.

The testimonial consisted of a handsome timepiece in black marble, surmounted with a bronze tazza. A silver plate of suitable design was attached to the base, containing the following inscription:—"Presented to John Barnett, Esq., by the Members of the North London Photographic Association, as an expression of their esteem and of their appreciation of his long and efficient services as their Secretary. March, 1866."

The proceedings then terminated.

London Photographic Society.

The usual Monthly Meeting of this Society was held in King's College, on the evening of Tuesday last, April 10th, Mr. F. Bedford in the chair.

The minutes of a former meeting were read and confirmed, after which the following gentlemen were ballotted for and duly elected members:—Mr. E. Bullock, Mr. Jas. Bullock, and Mr. R. Sinclair.

Mr. Hy. Cooper, Jun., read a short paper on "Printing on Silk," in which he stated that the formula published some two years ago was that he still used. The details will be found in a former volume, but his paper shall appear in our next. He explained that, from causes beyond his control, Mr. Hooper, who promised to illustrate the application of photography on silk, was not able to do so at the present meeting.

The Chairman referred to the beautiful results Mr. Cooper had exhibited some time ago, and regretted that he had not brought some of his recent specimens.

Mr. E. Bullock then read a paper on "Improvements in Litho-Photography" (which will appear in our next), and exhibited a large number of excellent specimens, which were examined with much interest, and excited general approval.

The Chairman said the paper read by Mr. Bullock was one of the greatest interest, and the specimens would illustrate to the Society the degree of excellence of which the process was already capable. Those who had given any attention to the subject knew how beset with difficulties it was. There was great difficulty in getting the photographic image transferred to stone, and also great difficulty in printing from the image when transferred. In some of the examples shown, these difficulties appeared to have been overcome very satisfactorily; especially the picturesque subjects, to which the process seemed well suited. He should like to know how many impressions had been printed from one stone, as some of the impressions of the same subject were much better than others.

Mr. Bullock said that they had not yet tested any stone with a large number of impressions. The difference in the prints to which the Chairman had referred was, however, due rather to the printing than to any deterioration in the condition of the stone, as the best prints were really those most recently done. They had every reason to believe that the stone would produce as many impressions as an ordinary lithographic stone.

The Chairman said that, on examining carefully the prints, he did not think full justice had been done in the printing to the photographic image on the stone. Possibly they had not been printed by a workman familiar with the highest class of chalk lithography; and very much, in all the best work of that class, depended on the printer. There were probably not twenty men in London who could do justice to a chalk drawing on stone.

Mr. Bullock said these were printed by a good commercial lithographer, who probably had not as yet had much experience in that class of work.

The Chairman said the workmen, in order to keep the image on the stone clear, had frequently to use an acid to wash it; many used beer—acid beer—in order to keep the work clean, and there was great danger, in this operation, of destroying the fine half-tones. The rapidity of this process and the facility with which a stone was prepared was a great advantage. He understood that one of these negatives only came into Mr. Bullock's hands last Thursday, and they had a transfer made and put down, and numerous specimens at this meeting on the following Tuesday.

Mr. Bullock said that they had really only printed from the negative on the preceding day, and transferred and printed many specimens by the day after taking it in hand.

The Chairman then tendered Mr. Bullock the cordial thanks of the meeting for his interesting paper and the excellent specimens exhibited.

Mr. Edgar Cox then proceeded to exhibit and explain an excellent and roomy Box Tent on wheels, which was examined with interest. We shall shortly give a detailed description of this dark room for the field.

The Chairman, after tendering the thanks of the meeting to Mr. Cox, announced that the Council had determined on holding an Exhibition Soirée, to which the members were invited to contribute specimens. The time and other details would be duly announced. He further announced that the Council hoped to distribute the medals at the next meeting of the Society, when it was hoped their President, the Lord Chief Baron, would be present. He regretted that the papers promised by Mr. Mayall and Mr. Joubert for next meeting would not be ready. The Secretary would be glad to receive any paper of interest.

The proceedings then terminated.

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Correspondence.

COPYRIGHT AND MAGIC LANTERN REPRODUCTIONS.

Sir,—Allow me, through your columns, to warn my brother opticians, or others who may be making magic lantern slides by photography *or other ways*, from copying any illustrations from books, &c., whether *one* or many copies be required for sale, or exhibiting or letting out such reproductions for their personal profit, without first obtaining the written consent of the holder of the copyright, as they are subject to be victimised, as I have just been, without any warning.

My case stands thus:—Some gentlemen came from abroad for the express purpose of getting me to fit them out with a first-class oxyhydrogen apparatus, and to design them an entirely new magic lantern entertainment—the pictures, as far as possible, to be new designs suited to the taste of a foreign audience; and all the appliances were to be packed in wicker panniers for mule carriage across the mountains, there being a sufficient supply of material for one hundred exhibitions. In carrying out the scheme of my story, to relieve the monotony of a series of picturesque views and dioramic effects, I required some comic adventures. I recollected some very clever designs in a book that had never been copied for the lantern, which just met my wants. From these I made a selection, and produced one set of sixteen subjects, by aid of photography, for trial. Through a mutual friend, I invited the author of the designs to come to my house to see them put upon the screen, at the same time making a general proposition to pay him a royalty on any of his designs that were suitable, which he would give me the opportunity of reproducing for the magic lantern. It afterwards appeared that this artist had no interest in the book, but that the copyright was vested in a person whose name nowhere appeared on the plates, letterpress, or binding. On making final arrangements, my customers excluded the comic element from their entertainment, and the slides referred to were left on my hands; but I sold them almost immediately to a person who asked specially for them, and who, it subsequently appeared, was the copyright-holder's agent.

A few days afterwards I was served with a "Bill of Complaint" from the Court of Chancery. This document comprised eight *printed* pages on foolscap paper, and set forth that one Woods was the sole proprietor of a book comprising thirty-six designs to illustrate three stories, and that I had piratically copied these as magic lantern pictures without the plaintiff's consent—had made and sold these copies largely—let them out for hire, and exhibited them to my great personal profit; that the sale of the plaintiff's work *had been seriously diminished* and *injured* thereby—and that I threatened and intended to continue such sales—therefore prayed that an injunction be issued to prevent me doing so in future; that I be called upon to render an account of all sales I had effected—pay all *profits* on such sales over to the plaintiff—and pay the costs of the suit in Chancery.

This "Bill of Complaint" was only true so far as it stated that copies *had been made and sold;* for I made no profit out of them, and sold the only set produced at cost price. The rest was merely a legal fiction, or rather farce, only I found it no laughing matter, as *at that stage* of the proceedings some £30 "costs" had been incurred. Of course the plaintiff's just ends might have been met by his calling on me, or informing me through his solicitors that he should enforce his rights, and requiring me to desist from the reproduction, especially under the circumstances I have mentioned, of my having been the informer against myself; then the costs would not have amounted to 30s.

Here I would call the attention of my brother tradesmen to the risk they run in selling magic lantern pictures copied from books, whether produced by hand or by photography, by themselves or through wholesale dealers, unless they first obtain, under some recognized form, the sanction of the copyright-holders, not merely to make, but to sell, such reproductions; otherwise they are not only liable, without any previous notice, to similar expense as I have been saddled with, but may have notice to render an account of all copies they have *sold* of any given works, and hand over the profits on such sales to the copyright-holder.

Now as to the merits of the question. On consulting with some of the oldest and largest producers of magic lantern slides, I find no precedent of copyright law having been hitherto extended to such "colourable imitations" of book illustrations—that sometimes they had asked for the loan of expensive plates, sometimes had asked permission to copy plates—this generally when they wanted to make special arrangements with the publishers for the letterpress descriptions of the same, where they wanted to sell a subject largely; but if they only wanted a copy or two for a special purpose, would not have thought permission necessary—thus showing that, as far as the opticians were concerned, there was no settled opinion that such reproductions would be infringements of publishers' copyrights, or that they would be subject to any penalty for copying book illustrations. On consulting the publishers of those illustrated works which I knew had for years past been copied for magic lantern slides, I found that they had never given their formal consent to such reproductions; but they *all* acknowledged that magic lantern slides could in no way interfere with the sale of their publications; nay, on the contrary, were regarded as absolutely advantageous. They had no desire to raise the question; but if the question were raised, they felt they must stand upon their rights, but, *as a rule*, they would throw no difficulty in the way of opticians, &c., obtaining some recognized permission. They one and all protested against the course which the plaintiff had adopted, as unnecessary to meet the required ends—in fact, that it was "vexatious"—a course which they, under similar circumstances, would never have given their sanction to.

Both publishers and opticians were agreed, not only as to the theory, but as to the practice, that magic lantern reproductions, by being exhibited in public and private, in town and country, *provided a means of advertising the works copied without expense to the publisher, and in a manner that could not be otherwise attained;* and, moreover, it led to the sale of a considerable number of books—so much so that, in the case of the "Tale of a Tub," the demand on the part of opticians absolutely led to the production of a new edition of that work, copies being required as descriptions to the slides of that very popular story. Of course, as opticians get a profit on the sale of such books, it is to their interest to push them into notice, and thus an agency is opened up for the publishers in connection with a branch of trade they could not otherwise expect assistance from.

That magic lantern reproductions can in any case clash with the sale of the originals is simply ridiculous. Such copies are in no way comparable with the production of photographs of an illustration sold at a low price to compete with the more expensive original—such productions being piracies proper, or improper; for, while the paper illustrations cannot be used as slides, the magic lantern copies are produced on a heavy material, glass, as a rule on a greatly reduced scale, and *at a price that is far in advance* of the cost of the original pictures; thus, in my case, the thirty-six coloured illustrations, with letterpress and handsome binding, sell for 7s. 6d. per copy, while I could not supply the thirty-six coloured reproductions on glass under £6, or 3s. 6d. each.

Some three years since, Andrew Muro, Esq., Advocate, published his opinion that magic lantern copies of illustrations and other works of art would not involve an infringement of copyright *within the meaning of the Act.*

As one of an old family of publishers, I feel that if a copyright-holder *chooses* to insist upon his protection against piracy extending to such or any copies of his property, he could maintain such rights; otherwise I should have called a meeting of the trade together, to see if its principal members were disposed to combine to fight the question thus raised for the first time by the plaintiff Woods; but considering the expense of law proceedings in general, and Chancery suits in particular, I felt assured the case was not worth wasting time and money over, when we could obtain all we desired by the simpler and cheaper process of asking the permission of the publisher of any pictures of which we wished to sell magic lantern copies. I therefore filed an affidavit as to the facts of the case, and prayed that, as no injury had been done, and that the plaintiff had given me no preliminary warning, I might be relieved of the costs of the suit, though I submitted to an injunction.

The result of this application I give in a copy of the letter from my solicitors, as they inform me that the case as reported in the papers is anything but a correct version of what took place in court:—

6, *Old Jewry, London, E.C., March* 19*th*, 1866.

Dear Sir,

Woods *v.* Highley.

We were unable to make any arrangement before the court as to the costs, the parties on the other side insisting that the time had not come for disposing of the suit, but only of the interlocutory motion before the court, which in practice is strictly true; therefore, the only order the court could make was to restrain you in the terms of the notice of motion, and leave the costs to be dealt with at a future time.

We ought at once to offer to pay costs to this time, or rely on our argument against any costs being allowed being effectual at a future stage; but we consider the last proposition too doubtful to justify your incurring any further expense.

Yours truly,

S. Highley, Esq.

Ashurst, Morris, & Co.

On a future occasion I will suggest, through your columns, what I think should be the recognised arrangements between publishers and magic lantern producers, or mere sellers.—Yours, &c.,

Samuel Highley.

18, *Green Street, Leicester Square, W.C.*

MR. CHERRILL'S THEORY OF DEVELOPMENT.

Sir,—About a fortnight ago I, in reply to objections raised by Mr. Johnson, asked how he would propose to account for a certain decomposition. In last week's News Mr. Johnson again writes upon the same subject, but carefully avoids all attempt to answer my question. His letter will, however, call for a few remarks which, as the subject may not be of general interest to your readers, will, I hope, conclude, for the present at least, my defence of the formula I proposed at the London Photographic Society.

The first half of Mr. Johnson's letter is devoted to the consideration of an absurd quibble on the use of the word "argument." Surely Mr. Johnson can see the sense in which I used the word in my last letter, though it seems I did wrong in calling the trivial remarks of the *British Journal* "an argument."

Mr. Johnson then informs us that he "cannot perceive the slightest analogy between the part which (NO_4) hyponitric acid performs in the process for obtaining sulphuric acid in the vitriol chamber, and that which acetic acid is supposed to play in development according to the new theory."

I never said there was any analogy for him to see between these two decompositions. I gave the formula for the one, and asked how, on the ground of his objection to the other, he would propose to *account for* certain phenomena which I pointed out; but we are informed that in "the formula, to which I called Mr. Johnson's attention," I "did not state the reactions correctly." I quoted the formula from one of the best *handbooks of chemistry.*

We read in the next place: "His (Mr. Cherrill's) formula omits all notice of the chief agent in the changes which occur—the bisulphate of nitric oxide (!). If the action of this interesting substance be duly considered, the reactions are neither anomalous nor contradictory." Mr. Johnson has failed to give us either the formula of bisulphate of nitric-oxide or the equation for its action; but he informs us that it is the chief agent in the decomposition which occurs in the manufacture of sulphuric acid.

I will quote from Fownes's "Manual of Chemistry," page 147, the formula for the decomposition,—

"$NO_4 + 2\ SO_2 + 2\ HO = NO_2 + 2\ (HO\ SO_3)$,"

and ask Mr. Johnson which of the substances mentioned in it is the "bisulphate of nitric oxide," and how it is that this substance is the "chief agent" in the decomposition?

Although it would appear from Mr. Johnson's remarks that, as I said before, he does not see the application of my argument, it may be well to point out how the matter stands. My theory of development involves the supposition that the silver liberated by the action of sulphate of iron seizes, for the moment, some oxygen from the acetic acid, and that this oxygen is restored to the acetic acid when, from the nature of the decomposition which is going on, there is an attractive force sufficient to effect the decomposition of the aldehydate of silver brought to bear upon it. To this theory (which

I have explained more fully elsewhere) Mr. Johnson objects, that if the balance of chemical affinity is in favour of the decomposition,—

$$Ag\,O\,Ac\,O_2 + HO = Ag + Ac\,O_3\,HO,$$

silver cannot rob acetic acid of one equivalent of its oxygen.

Mr. Johnson assumes that there can be no change in the force of the various chemical affinities, though chemical decomposition is going on with rapidity all the time. In order to show that such a general proposition is not of itself sufficient to upset my theory, I gave a formula for a decomposition, allowed to be correct by all chemists, in which NO_2 absorbs oxygen, and then immediately gives it up again. Mr. Johnson's observations on the balance of the chemical affinities should apply to all cases; that is, NO_2 having absorbed oxygen should, according to Mr. Johnson, be unable to give it up again; but we know that it does so; and therefore I contend that, from Mr. Johnson's argument, it does not follow that my theory must fall to the ground.

I do not deny that my theory may seem incomplete to those who do not understand it, but I submit that, as yet, no valid arguments have been urged which can be said to disprove it; and I do not think it will be disproved by any gentleman who can make the assertion that the bisulphate of nitric oxide is the chief agent in the manufacture of sulphuric acid.—Yours truly, Nelson K. Cherrill.

Belmont Lodge, Lee, S.E.

[With this letter the subject must terminate.—Ed.]

THE ORIGIN OF MODERN CARBON PRINTING.

Sir,—In the News March 29 you take Mr. Nicol and myself to task for a statement he made at a meeting of the Edinburgh Photographic Society. I have no intention of defending Mr. Nicol—he can do that himself if necessary; but, if you allow me space, I shall state shortly facts well known to him and others, but perhaps unknown to you, which will go so far in explanation of his remarks, and show that he was aware that I had been doing something to render carbon printing possible at a rather early date.

My experiments in photo-lithography commenced in 1862, and in the autumn of that year an arrangement was made by which I was to write a paper on that subject, but, through Mr. J. T. Taylor, of the *British Journal*, then Secretary of our Society, it was broken, and he wrote instead a series of articles on "Photo-lithography, and Photographic Engraving;" but on February 18 of the following year (1863) I read a paper entitled "Practical Details of Lithography," a considerable portion of the matter of which was *vivâ voce.* The report of this meeting was published March 18, 1863 (*British Journal*, vol. x., page 127). The paper itself was not published, but an extract from it was, in which occurs the following passage:—"On the much-contested question of half tone I do not propose to enter at present, further than to state my belief in the absolute impossibility of *reproducing* it by means of photo-lithographic transfer; and, although my experiments have not been what may be called exhaustive, yet they have been sufficient to convince me that, no matter how promising the transfer may look when ready for the stone, yet the moment it is transferred, your hope of anything like delicate half-tone has vanished." "He then went on to say that gradation of tint must be sought for in some other direction, or by some other method, and promised to show what success he had had in that direction on an early and less formal occasion." From this it will be seen that so early as 1862 I had succeeded in producing transfers with half-tone, but found my difficulty in *reproducing* it from the stone. In accordance with the promise given, I got two negatives—Edinburgh Castle and Holyrood Palace—from Mr. Archd. Burns, for the purpose; and on the first or second meeting thereafter, exhibited prints from them, which were fairish, but not perfect specimens of half-tone. These prints were non-reversed, proving that I then knew how to reverse the image before laying it on the stone. In the November following, the meeting of the Social Science Association took place in Edinburgh, and to that meeting copies of these negatives were sent and placed in folio with the examples in line by Ramage, Osborne, myself, and others; the Edinburgh Photographic Society having two of the bays under their charge. On the following day a gentleman, who said he was from Newcastle, who had been present the evening before, called on me at my place of business, stating that he was very anxious to know of the possibility of printing in half-tone, and showed himself most desirous of knowing all my methods, and exhibiting considerable skill in cross-questioning; at length, worn out by his pertinacity, I sent home for the unpublished paper spoken of above (of which I had no copy), and entrusted it to him, with a promise that it should be sent back by post. I have never either seen or heard of the gentleman from Newcastle from that day to this.

I still continued my experiments; and in another paper, entitled "Applications of Photography to Art Manufactures" (*British Journal*, vol. x., page 425), I recur to them and say, speaking of pottery and ceramic ware: "And should the capabilities of photo-lithography prove sufficient for gradation (which, from present experiments, I am beginning to hope) as well as lines, we may consider this point as settled, as by its means any and every colour could be transferred with the same facility that common woodcuts are, and probably as cheaply." Any one who knows the operation of photo-litho work will be aware that to secure the desired result in tints we must either work with a reversed negative, or the print must undergo a preliminary transference from the supporting medium. I still worked with the negatives spoken of as tests, so that I was bound to reverse my transfers, and this formed one of the principal difficulties; but I had surmounted it thus early. Increasing business avocations prevented me making more than occasional attempts to forward the process, and it fell into comparative abeyance till Mr. Swan's process was announced.

My friends in the Society urged me to publish my experiments, in order to secure recognition in this matter. Accordingly, I sent an account of the principle and materials to a friend in London, and requested him to attend the London meeting, with instructions to request liberty to read my letter, if the principles of Swan's method should be found to be like mine. He consulted with a friend, and did not think my suggestion desirable; so it was arranged that I should read a paper detailing my process, methods, &c.; but as our meetings in the summer session are monthly, I could not read it before July 6th, that being the first night I could bring it forward.

In your article you say: In Mr. Swan's final specification, sealed September 14, 1864, he details minutely this method of working, &c., and, therefore, three weeks before the reading of Mr. Davies' paper. Is September 14 three weeks before July 6? But if you refer to the report of the meeting at which my paper was read, you will find I spoke with considerable chagrin at being anticipated in the publication of methods as well as of materials the uses of which had been familiar to me for years, and that I do not in the paper make any claim to priority of publication, although my efforts were known to a few, and among those, I presume, Mr. Nicol, who thought that my claims were perhaps stronger than were generally allowed. The specimens also which I showed may be considered proof enough (if that is wanted) of my familiarity with the different manipulations.

W. H. Davies.

Photographic Notes and Queries.

Blue Skies—Heat in the Studio, &c.

Sir,—I am pleased that Mr. Seeley has admitted that heat is objectionable in the studio, and shall consider I have done good service if my remarks will induce the profession to adopt means for ventilating and cooling the hot and stifling dark holes, destructive alike to health and good photography, in which so many operators are obliged to pass the chief of their working hours. I have no doubt collodion can be made which will work in a tropical climate, but my remarks are intended for the collodion in general use, which exhibits a decided loss of half-tone, and a tendency to pinholes, spots, stains, and fog from 80° Fah. upwards.

Mr. Seeley's suggestion of photographing white clouds against a blue sky raises a very interesting question—namely, the difference in actinic power between a reflected solar ray and a direct sky ray.

As my studio is furnished with screens for reflecting sunlight when an almost instantaneous exposure is requisite for children, I am independent of white clouds for this office, and cannot give a very decided opinion on this point; but I have taken the experience of my printer, who, not being allowed to print by sunlight, could, I thought, give valuable evidence; and he says, that when the sky is covered with clouds at a sufficient elevation to reflect solar light, printing proceeds much more rapidly than under a clear blue sky. If this opinion is correct—and I see no reason to doubt it—the balance of evidence is in favour of the reflected solar ray. But I cannot perceive how the establishment of this fact impugns in any way the truth of the theory I have advanced; on the contrary, by clearly showing that diffused light is not caused by the solar rays suffering reflection in their passage through the atmosphere, it is the more strongly confirmed.—I am, Sir, respectfully yours, Thomas Ayers.

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Talk in the Studio.

Soiree of the Photographic Society.—As no public exhibition of the Photographic Society will be held this season, it has been determined to hold an Exhibition Soirée, to which it is hoped such contributions will be made as will help to illustrate what has been done, and what progress has been made during the past year. The Soirée will be held in the large hall of King's College, some time in May. The exact time will be duly announced.

Anecdotes of the Studio.—The *Philadelphia Photographer* gives the following incidents of photographic experience in the States:—"In Dubuque, Iowa, a country chap entered a gallery to have his likeness taken; in fixing his hair he took a bottle of collodion which was standing near him, and thinking it was hair oil (and cheap, too), used it plentifully. He thought there must be something wrong though, as his hair commenced straightening and standing on end. Of course, the artist sent him to several drug stores to get something to take it out. Second. A brother artist in Omaha, N.T., was evaporating his bath. He left it standing in the glass room in the dish. A lady, with three children, came in. The children's faces were covered with molasses candy, or something like it. Seeing the dish, and thinking it was water, she took her handkerchief, dipped it in the solution, and commenced wiping the children's faces. After a while the children were to be performed upon; but 'Hold on,' says the lady, 'I have not got my children clean yet.' She commenced dipping and washing again, but this time without any use; and finally she left the place crying, with three little negroes, the artist not even giving her anything to take it off."

Photographic Company.—Amongst the public companies registered in 1865, we find one entitled "The Art and Decorative Photographic Company," with a capital of £25,000. Is such a company in practical existence and at work? If so, its proceedings are managed with great privacy, for we have not heard of them.

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To Correspondents.

T. W. A.—The whole matter rests on the nature of the original agreement. If you received a commission to take the portrait, and received for it some payment, the copyright cannot become yours without an agreement in writing. If, on the other hand, you desired the person to sit to you for your own purposes, and you took the portrait on your own account, then the copyright is yours, and you can, by duly registering it, secure it to yourself. In the latter case you can dispose of it as you choose, unless your power to do so is limited by some distinct agreement. It appears to us one of those cases in which it is best to come to some agreement by mutual concession.

April 5th.—The formula for printing on silk appeared in our Year-Book for 1863, 1864, and 1865, as well as in various numbers of the News; it is somewhat too lengthy to be repeated in this column; we shall, however, print a paper on the subject, by Mr. Cooper, in our next. White silk is employed. 2. A little over-printing is required. 3. The toning is similar to that of albumenized paper. 4. The prints are washed after fixing in the usual way, and the print is finished by ironing. 5. Silk ribbon will answer well.

C. H. Free.—We quite understood you, and shall be happy to give you further information, if we can, on any point you may require.

Excelsior.—The card is, in most respects, very excellent. The chief defect consists in the curtain forming an unmeaning patch. It should either not have been there at all, or, if there, it should have formed a more definite part of the picture. A curtain is best when the widest part is at the base of the picture; and in this instance it should have been lighter, so as not to cut so hard against the somewhat light background. But the brilliancy, delicacy, and modelling of the picture are unexceptionable.

Firefly.—The best lens, in our experience, for architectural subjects, and suitable for landscapes as well, is the triple.

E. E. C.—The small spots on the card sent are due, we believe, to an imperfection in the paper itself; but of the precise nature of the defect we are uncertain. The extraordinary print with the odd stains and imperfect image appears to have been produced on paper imperfectly sensitized, probably from having been floated on a weak solution, upon which many sheets had been floated without any agitation or disturbance of the solution. It will sometimes happen that the upper stratum of the silver solution is thus robbed of almost all its silver, and that the bath requires agitation or replenishing.

G. T. R.—The salting solution may be applied with a brush if you prefer it. A Buckle's brush would answer: this consists of a piece of cotton wool drawn partially through a glass tube, so as to leave a tuft at the end to serve as the brush. Or a piece of Canton flannel tied on to the end of a stout strip of glass may be used. 2. A stout *Rive* paper, or Whatman's drawing paper may be used. 3. Great care to keep the back of the paper dry is an excellent mode of keeping it free from stains during development. Turn up the edges so as to make the sheet form a dish, and work on a clean plate of glass. 3. The amount of acetic acid to be used much depends on circumstances; keep a solution of aceto-nitrate of silver, 15 grains of the nitrate and 15 minims of glacial acetic acid to an ounce of water, and add a few drops to the plain solution of gallic acid. If the development be too quick, or the whites discolour, add more acetic acid to the mixed developer. 4. We do not think condensers are usually kept in stock, but you can order one of any respectable dealer; 9 inches diameter and 18 inches focus will answer. 5. One ounce of hyposulphite in four of water. 6. The salted paper can be preserved for months if kept dry. We are always glad to assist you.

Old Pupil.—The fact that you do not know the owner of a copyright gives you no right to assume that it has no owner; you possibly may copy the picture without being challenged, but you always run the risk of prosecution in such case. 2. A study of the general principles of chemistry will be necessary to obtain the information you require. Fownes's "Manual of Chemistry" is the best book of reference you can possess on such subjects. 3. The terms of engagement and periods of notice are matters of agreement to be determined upon at the commencement of an engagement, by which agreement both parties are bound; in the absence of such agreement much will depend upon many minor circumstances only within the knowledge of the parties. 4. A portrait lens or a triple will answer best. 5. Yes. 6. Chloride of ammonium is very sparingly soluble in alcohol, in absolute alcohol scarcely at all. Water will dissolve freely.

Wells.—We do not know any work on the art of grinding lenses.

G. Haberer.—The address of Johnston and Sons is Basinghall Street.

C. Oakeshott.—Thanks for the pamphlet, which shall be duly forwarded. We have reason to believe that Mr. Swan will supply his tissue ready for sensitizing very shortly. We have been working with some of it lately with great success.

Wm. Sturgeon.—We are familiar with the wavy lines of which you send us an example. They arise from various causes. Sometimes it is irregular drying of the film; sometimes from imperfect washing; often from the horny character of the collodion, which does not permit the preservative solution to permeate readily and perfectly, and thus these irregular lines are formed.

A Constant Subscriber.—We have seen, if we remember rightly, the argand lamps with yellow glass at the warehouse of Mr. Hughes; but we believe they are generally kept by dealers.

E. M.—The spots are caused by imperfections in the paper.

Odell.—There are various modes of cleaning oil paintings, depending on the condition of the picture. The cleaning of a valuable picture should not be undertaken except by a person well versed in the matter. Sometimes well sponging with water will effect great improvement; sometimes rubbing with a slice of raw potato will better effect the same end; sometimes the varnish must be removed to effect a thorough cleansing. If it be a mastic varnish, it is removed by gentle friction with the fingers. If other varnish, solvents must be used, and the process is very dangerous. Gentle sponging and friction will remove paper which has stuck to the varnish. Mastic varnish is best for revarnishing. We do not know any house which undertakes the printing of opal pictures.

T. B. Allport.—In order to transfer the albumen film containing the image from paper on to glass, the picture must be printed on the paper properly prepared for the purpose, supplied by Trübner, of St. Dunstan's Hill.

R. P. S.—The brown stain is the result of imperfect fixation. The hyposulphite has been too weak, or exhausted, or the parts have stuck together, or immersed for too short a time. The insoluble hyposulphite of silver is thus formed, which becomes decomposed during washing, and causes this brown discolouration. 2. We do not know where you can get the card in question; Mr. Atkinson, of Liverpool, is the most likely.

Received, and will be noticed in our next, a series of Mr. England's recent Views in Switzerland.

C. H.—Received, with enclosure of post office order for Photographer's Aid Fund. In our next.

J. Harrison and several Correspondents in our next.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

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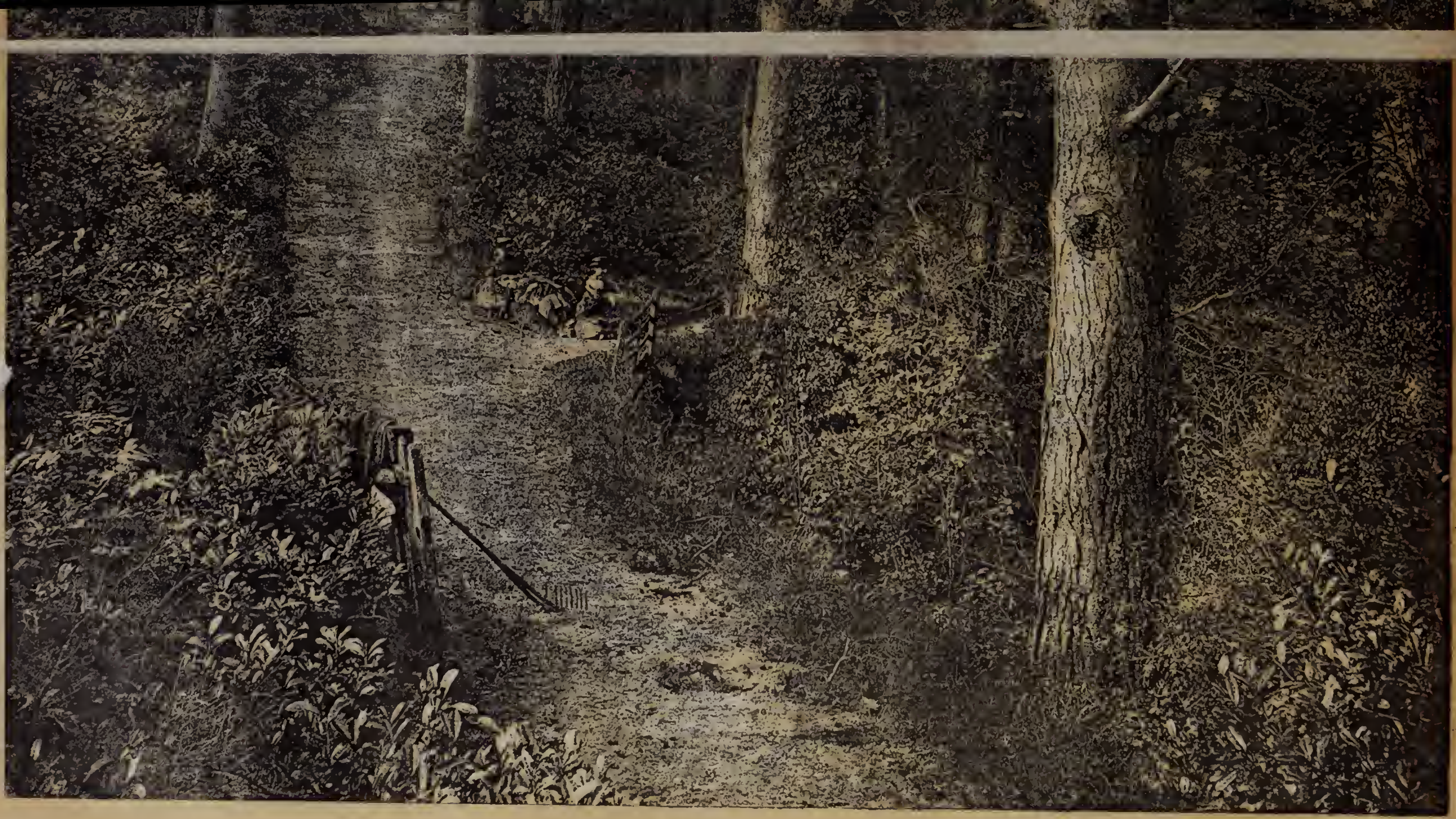

LITHO-PHOTOGRAPH, FROM NATURE.

Printed by Messrs. Bullock Brothers' Patent Process. *From a Negative by Major Gresley.*

PRESENTED WITH THE PHOTOGRAPHIC NEWS, APRIL 20, 1866.

THE PHOTOGRAPHIC NEWS.

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A PHOTOGRAPHERS' RELIEF FUND.

We are happy to be able to announce that our suggestion for the establishment of a Benevolent and Provident Fund for the aid of photographers has met with extensive approval, and promises shortly, we hope, to assume a practical shape. Already a project is afloat which promises a valuable commencement in the acquisition of funds. A gentleman, at present to be nameless, has offered to contribute the sum of twenty pounds, if nineteen other gentlemen can be found to follow his example. We have no hesitation in offering to become one of the required nineteen; some of our friends, whose names we are not yet authorized to mention, have promised to do the same. We cannot doubt that the required number will be found, and, as soon as a definite form of organization shall have been determined upon, that a sum of four hundred pounds will be forthcoming as the nucleus of the benevolent fund. The contribution of a sum of twenty pounds, and possibly of less, will, in all probability, in this, as in other similar institutions, constitute life membership; and this fact may operate as an incentive to contributors, and secure an efficient fund to commence with.

In the meantime we shall take measures to obtain information as to the management of other similar institutions. We are now in communication with a gentleman who has made the working of Provident Societies the study of his life; and from him we hope to obtain aid and information. We shall be glad, also, to receive any hints, information, or aid which may assist in the establishment of such a valuable institution amongst photographers.

Since the above was written, we have received a letter, which appears in another column, in which the writer offers to contribute five pounds, if one hundred others will do the same. We have no doubt that, as soon as an organization is formed, funds will be forthcoming.

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MESSRS. BULLOCK BROTHERS' PROCESS OF LITHO-PHOTOGRAPHY.

According to promise, we present our readers, in the present number of the Photographic News, with the first issued example of the litho-photographic process recently patented by Messrs. Bullock Brothers, of Leamington. We may explain at the outset the special meaning intended to be conveyed by the inventors in the name they have chosen,—litho-photography, in contradistinction to the common term photo-lithography, as in this distinction they wish to indicate the difference in the results produced. In the processes already familiar to the public, or at least such of them as have been really successful, photography has been used as an adjunct to lithography. A drawing or engraving, in line or stipple, produced by hand, has been necessary to commence with; this has been reproduced by photography, as a rapid means of securing an absolute *facsimile*, to transfer to the lithographic stone, and the result has been a lithograph, such as could have been produced on the stone by hand, although with less ease and exactness than by photography. The latter having, then, been used as an aid in producing the lithograph, the result is styled a photo-lithograph. In the process of the Messrs. Bullock there is a distinctly different aim; the object is to reproduce a photograph from nature, in all its true gradation of half-tone, lithography being made an adjunct to photography simply as a means of rapid and permanent printing; hence they conceive that the result is more correctly described as a litho-photograph. It is unnecessary here to discuss the etymological exactness of this distinction; it is sufficient that it will serve to indicate the difference between both the methods employed and the results produced.

It is well known to our readers that the aim to combine photography and lithography has occupied the attention of many able experimentalists. In 1853, M. Lemercier published a process, in which the action of light on bitumen of Judea was made available. Mr. Macpherson subsequently worked with considerable success at a similar process. M. Poitevin next introduced the use of a bichromate and organic matter for the same purpose, and a variety of changes have been rung on this method, with greater or less success. In the earlier experiments in photo-lithography, attempts were made to photograph the image, either in bitumen or bichromated organic matter, direct on the stone, which was placed in the camera. This clumsy method was superseded by printing on the stone a negative or transparent positive, as might be required by the after details of the process. Next came the more perfect and simple method of producing an image in transfer ink on paper, and transferring that image to the stone by the method commonly used by lithographers.

So far as the process of getting an image, produced by photography, satisfactorily on to the stone is concerned, the process of photo-lithography may be pronounced tolerably complete. Properly managed, the transfer system seems to be perfect; and we have seen pictures, in line or stipple, which leave little to be desired. The origin of the transfer idea is claimed by various persons. So far as we know, it was first practically and successfully used by Mr. J. W. Osborne. It was, however, probably independently discovered by others. M. Asser, of Amsterdam, and Col. James, of Southampton, we believe, both used it independently; and to these, and a host of other gentlemen, more or less of credit is due for improvements in this branch of our art, amongst whom we may mention Mr. Ramage, of Edinburgh; Mr. Lewis and Mr. Beattie, of Dublin; Mr. Griggs, of London, and others.

The great difficulty has been, however, to secure a lithograph which reproduces the proper half-tone of a photograph from nature. It is not necessary that we should enter into an explanation of the various modes in which gradation in a picture may be secured. The reader knows that in a photograph, the gradation consists of different depths of a continuous tint; whilst in a picture produced by mechanical printing, whether copper-plate, wood-cut, or lithographic, the gradation must be produced by lines or dots, presenting greater or less surface, and being in greater or less proximity to each other. By the processes now within the reach of the photographer, an image in perfect photographic gradation can be transferred to the stone; but it is unfortunately of no use when so transferred, as it cannot be printed from. It may be necessary to remind the reader that the image on a lithographic stone consists of greasy ink. In printing, the stone, being first wetted with a sponge and then rolled with printing ink, receives the latter only on the image, which, being greasy, repelled the water when the stone was sponged, and therefore readily receives the greasy printing ink, which the stone, being wet, repels. A sheet of paper laid on the stone, and being subjected to a scraping pressure, receives the ink, and thus produces a print; and so the process is repeated for each print required. But the fact that the image is formed of different thicknesses of greasy ink, constituting different gradations, would be ignored in this mode of printing; the lightest half-tone would quickly roll up into the deepest black; wherever greasy ink existed in the image, there an affinity for greasy ink would exist; and the image, however perfect in half-tone when first put upon the stone, would soon become one mass of black and white, without any gradation whatever. It will be seen, then, that some device must be adopted to convert the photographic half-tone, which is a continuous tint, into some kind of gradation which is broken into a variety of points. Various plans have been tried, many of which consisted in using a grained stone; that is, a stone made rough, like that employed for what is technically known as chalk lithography, in which the numerous points of the rough surface only receive the ink. It was conceived that if a photographic transfer were put upon a grained stone, the points only would receive the image, the numerous little hollows remaining untouched, and a printing surface with a stippled gradation would be secured. This only partially succeeded, however. It was proposed to interpose between the negative and the bichromated paper on which the transfer was produced, a thin sheet of gelatine, on which a stippled grain was produced. We have before us at this moment such a sheet of gelatine, sent to us some years ago by Mr. Ramage, of Edinburgh, whose work in line was most excellent. Whether the stippled surface answered or not we never heard; but it does not seem to have come into use. Colonel James produced some promising results with half-tone, produced by a certain decomposition in the film, upon which the transfer was taken; they were not perfect, and of late nothing has been heard of them. Messrs. Simonau and Toovey produced some very fine results with half-tone some years ago, examples of which are now before us. Until we had seen those of Messrs. Bullock Brothers, these were out of all proportion the best we had seen. The process by which they were produced was not stated; and as it has not come into use, we fear that some uncertainty in working it must exist. Mr. Swan has recently patented a method of converting photographic half-tone into a stippled or crayon-like gradation, which appears very perfect indeed, and promises well; as yet we have not seen results, but hope to do so shortly.

We now come to the process of Messrs. Bullock Brothers, a specimen of which is before the reader, who can form his own opinion of the excellence of the result. One or two explanations may assist him in forming a critical estimate. We may first remark that photo-lithographs generally fail in two essential particulars,—they lack depth and richness in the blacks, and they lack delicacy and definition in the half-tones. These faults are much due to the inherent characteristics of lithography, as to the nature of the photographic image transferred. In the process now under notice, whilst not possibly for all subjects absolutely perfect, the usual defects are overcome in a degree far surpassing the processes of the same kind which have preceded it; and an amount of perfection has been already attained, in the infancy of the process, which renders it applicable at once to many purposes, and promises a still higher degree of excellence as the result of various modifications which the inventors have already in contemplation as fitting it for other applications. It will be seen that here are already attained perfect and clear blacks without any rottenness, and an amount of delicately defined gradation until now unknown in photo-lithography.

The print presented with the present number is the simple result of the process, without any retouching or manipulation of any kind whatever. It is, moreover, the result of ordinary commercial lithographic printing, produced by a good workman doubtless. To produce the very finest results in lithography of this kind, a very high amount of skill and care in printing are required. As depth can only be attained by colour, not by thickness of ink, the very finest quality should be employed. As there is a constant tendency for the ink to spread laterally and fill up the delicate portions of the image, the stone requires constantly re-etching or washing out with gum-water and acid, or acid beer, to remove the first indications of a clogged image. The process which will remove the first traces of the abnormal deposit, or rather absorption, by the stone, will also, unless extreme care be used, remove some of the delicate half-tones. A fine chalk lithograph requires such careful printing, that a good workman will produce less than one hundred impressions in a day; the examples we now issue have been produced at the rate of five or six hundred per day. We make these explanations in nowise to depreciate the excellence of the result we bring before our readers, or to imply the need for any apology—for the result is superior to anything of the kind which has been issued—but simply to be just to the process and its inventors, and to explain that these prints are an ordinary commercial result of the process as applicable to a variety of purposes.

It will be obvious, from what we have said, that where higher pictorial results are required, they may be very easily produced. With such an image on the stone as that from which our illustration has been produced, it will be tolerably clear that a very little expenditure of time by a skilled lithographic draughtsman might produce great improvement in artistic result. Skies and figures in landscapes might easily be added; offensive lines obliterated; force and depth given to one portion, and light to another; and an infinity of effects readily possible to the artist accustomed to working on stone.

In choosing a landscape, we were anxious to illustrate the capabilities of the process; but we may mention that as architecture is the easiest class of subject for such a process, so, in an architectural picture, a higher comparative excellence would appear to be attained.

Our readers already know that Messrs. Bullock Brothers employ a transfer process, and thus all risk to the negative is removed. Where the image is printed on the stone direct from the negative, there is of course great risk of breakage; but as the transfer image is printed on paper, any number of them can be produced without risk to the negative. The mode in which the gradation is produced in the print we issue is that which will be most commonly employed, although the specification includes other methods. In this case transfer paper is prepared with a coating of gelatine; upon this is printed a grain from an aquatint plate, the fineness of the grain being determined by

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* On Monday Messrs. Bullock Brothers sent us a print after 2,600 impressions had been taken from one stone, intended to show us that the impression was as fine — as it undoubtedly was—as the first copies we saw; and we have every reason to believe that the remainder of the copies then to be printed would still be very perfect, so that all the prints received by our readers will be equally good.

the character of the subject to be transferred. The more delicate the gradation, the finer the grain required to render it satisfactorily. The paper in this state, ready for sensitizing in a solution of bichromate of potash, will be supplied by the Messrs. Bullock to their licensees. The exposure under a negative, the inking of the surface, the floating on hot water to remove the unaltered gelatine, and the ink with it, leaving only a perfect image in transfer ink, and the putting down on the stone, have all been described in our pages.

The subject of the present illustration is a grove of trees in Worcestershire, the negative, a fine one, by Major Gresley. It is printed on toned paper with sufficient margin, when mounted on a board, to give the effect of an Indian tint. Those who wish to preserve the print for binding with the volume will find it best to attach one edge with a little paste to the back edge of the page, and fold the picture so that it will not be cut by the binder in binding the volume.

Critical Notices.

VIEWS OF SWITZERLAND AND SAVOY. By William England.

In the selection of photographs of Swiss scenery before us, we have the highest perfection of landscape photography: in every technical point it would seem impossible to attain a higher degree of excellence than is here secured, and at the same time nothing is left to desire on the score of artistic rendering. Perhaps nothing would more admirably illustrate the progress of photography, than a careful examination and comparison of the various views of Switzerland and the Savoy, which have been produced during the last dozen years. The subjects, always grand and attractive alike to the artist and photographer, have been favourite practice-ground for amateur and professional photographers. At one time we accepted, as necessary conditions, the hard, black and white character of the photograph. Snow-clad mountains and deep green foliage; masses of glacier ice and deep ravines into which the sun rarely peeped, seemed to present such irreconcileable effects of light and shade, and (especially when taken, as they must be, in broad sunlight) so impossible to harmonize, that when we saw the sharp, hard, black patches in the midst of masses of white, we scarcely thought the photography at fault, although we regretted its shortcomings for certain classes of work. This has been for some years changing; and we have had during the last few years many fine photographs of Alpine scenery; but the pictures before us far surpass all that we have seen before in almost every quality of excellence. There is an exquisite delicacy of gradation, an infinity of exquisitely marked demi-tones, which we have rarely seen even in very good photographs. With the greatest brilliancy and richness of contrast, there is scarcely a single space or object larger than a pepper corn of a pure white or pure black in any of the pictures; but still minute traces of these extremes are there, giving infinite value to all the gradations of mezzotint, and conferring great brilliancy on the whole.

In artistic feeling the pictures are admirable: the selection of subject and point of view, and the arrangement of figures, all indicate a fine and cultivated taste. Where all are so good, it is difficult to select individual examples; but we mention, as amongst those which especially please us, Nos. 311, 103, 309, 79, 78, 279, 104, and 314; the last is, perhaps, the finest example of grey rock and deep green foliage, together with broken water, leaping, rushing, and foaming down a gorge over and amongst large boulders—all rendered with the most perfect delicacy and harmony, without a white or a black patch anywhere—which we have ever seen produced by photography.

The size of the pictures is 8½ inches by 6½ inches, produced for the most part with Dallmeyer's new wide angle single lens. The printing is exquisite, the tone, which is uniform throughout the series, being a rich warm black. They are neatly mounted on a very pleasing tint, which is, in these instances, we think, even more pleasing than the ordinary India tint. They are of course produced by the wet process, the details of which we have before published.

TRAITÉ D'OPTIQUE PHOTOGRAPHIQUE: Comprenant la Description des Objectifs et Appareils D'Agrandissements. Par D. V. Monckhoven. Avec Figures dans le Texte et Planches. (Paris: Victor Masson et Fils.)

The need of a work devoted solely to the optics of photography has long been felt and acknowledged. The difficulty which has deterred many from undertaking the task, and which has been the cause of the very partial success which has attended chapters or articles in manuals or journals, arises out of the fact that it is necessary, on the one hand, in order to secure accuracy, to treat the matter scientifically; and, on the other, to make it intelligible to the mass of the readers for whom such a work is written, to treat it popularly; and it is difficult to popularize optical science. Dr. Van Monckhoven, in treating the subject as a scientific question, has avoided unnecessary ambiguity, and made the subject clear to the moderately educated reader. The work is very complete, and profusely illustrated with diagrams and other engravings. We forbear, however, beyond this general commendation, from entering into any critical estimate of the work at present, as an English edition of the work is, we understand, in the press. When it is issued it will become our duty, probably, to enter fuller details of the work for the information of our readers.

ANNUAIRE PHOTOGRAPHIQUE pour L'Année 1866. Par A. Davanne. Deuxième Année. (Paris: Gauthier-Villars).

M. Davanne has in this little annual presented French readers with an admirable *résumé* of the progress of the year, and of the present practice of photography. An interesting feature consists in a series of synoptical statements of formulæ for different processes, with a blank page opposite for making memoranda of the modifications of the operator. It is to us an interesting fact to note how many works of the same kind in this country, America, and the Continent have had their origin in the establishment and success of our own Year-Book, the first work of the kind that went beyond the general characteristics of an almanac.

MR. HART'S NEW FILTERING APPARATUS.

One of the most ingenious and simple little pieces of apparatus which has come under our attention for some time is Mr. Hart's "Economic Filter and Percolator." The task of filtering silver solutions—for which, although useful for any solution, this invention is principally intended—is never a pleasant one; it is often slow, often messy, and generally a wasteful process. By means of this apparatus it becomes rapid, clean, easy, and economical. The principle is very simple, the operation being based on pneumatic pressure. An upright glass jar is provided with an air-tight top with two apertures. In one is placed a funnel, through a cork in the stem of which passes a bent tube, just communicating with the interior; through the other a tube passes to the bottom of the jar, where it is connected with a piece of pure felt, or other filtering material. If the vessel then be filled with any liquid, and air pressure be applied by blowing into the bent tube in the funnel, the liquid will rise in the tube which is fixed in the middle of the bottle, and pass out through the india-rubber tube connected with the glass tube. In passing into this glass tube, however, it must pass through the filtering material attached to its orifice at the bottom of the bottle. The india-rubber tube to which we have referred must of course be sufficiently long to act like the longer limb of a syphon, hanging lower than the level of the liquid, and thus, after a momentary application of the lips to the bent tube, the operation of filtering commences, and a 40-ounce bath is rendered perfectly bright and clear in two or three minutes.

For the printing bath, Mr. Hart recommends that a little chloride of silver be kept at the bottom of the bottle, as the best agent for decolourizing the solution. It is then only necessary, after printing, to pour the solution into the apparatus through the funnel, agitate for a moment with the chloride of silver, and then put it aside until it is next required; it is then filtered into the dish in a minute, bright, clean, and ready for use, without further trouble. The advantage and comfort of such an arrangement must be manifest to every one. It is worth remark, also, that in using chloride of silver for decolourizing, there is no danger of contaminating the bath, as if a trace of it be dissolved in the solution, no possible harm can result, as it is simply the material upon which the print has ultimately to be formed.

For the collodion bath, the simplicity and cleanliness of the operation are equally of importance, and for tourists invaluable, as, with the facility here presented and ordinary care, a bath could be filtered in a sitting-room without danger of causing stains. It will be obvious to the photographer that such a filter will be valuable for many purposes besides clearing silver solutions, and to the operative and experimental chemist the name of the purposes to which it can be applied is legion. We append the engraving and description from Mr. Hart's prospectus, as containing many interesting details, and suggesting an orderly and economic system of working suggested by Mr. Hart; the object being to save trouble and time, and prevent mess and waste. The engraving illustrates some of the various purposes to which the apparatus can be applied. The box and upright rod with cross-piece is a stand for drying paper and catching the drainings of the silver, which are here made to run into the filter again.

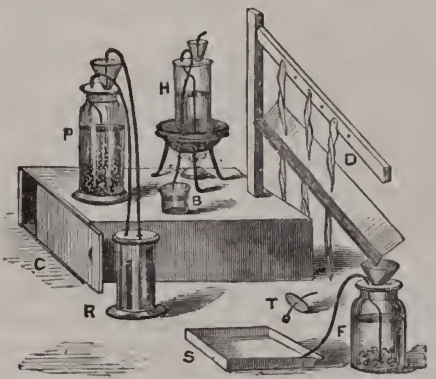

Fig. F represents the apparatus in the photographic process of filtering and purifying the nitrate of silver bath for paper. When sufficient paper has been floated on the cleansed solution in the sensitizing dish S, it is poured back into the apparatus through the funnel, where it remains until required again.

It is particularly requested that washed chloride of silver be used (that from the print washing waters will do) as a cleansing powder for this bath, in the proportion of an ounce to the quart, F. W. H. and others, from long experience, having found it the most economical in practice (all other cleansing powders carrying foreign matters into the residues, which necessarily detract from their value), it being put into the residues when inert. If the apparatus is graduated in ounces, the quantity filtered can always be seen, as also the amount used in the operation. After testing, nitrate of silver and distilled water can be added in definite proportions, to keep up a uniform strength and quantity. "This apparatus is invaluable" (as expressed by eminent photographers) "to photographic tourists for the negative bath," as by its use, the necessity for extra funnels and filtering paper is entirely obviated, the apparatus requiring to be cleaned out but seldom. When that is found necessary, the large glass stopper is to be taken out, the filtering medium removed, carefully washed, and returned to its place. In photography the apparatus is also recommended for developing, fixing, and other stock solutions.

N.B.—In all cases the method of starting the action is to insert the stopper tube T in the funnel, and gently blow through it until the solution begins to flow. On first using a new filter, it may be necessary to return the first portions of the filtrate. By placing the apparatus on an elevation, and lengthening the exit tube, the pressure, and consequent rapidity of action, can be augmented to almost any extent: the action is stopped by placing the exit tube in the funnel, or by a stop cock.

Fig. P represents the apparatus, with a receiver R, in the process of percolating and filtering a spirituous extract *without contact with the external air:* any kind of filtering medium usually employed in these cases can be adjusted to the apparatus.

Fig. H is the arrangement for making aqueous extracts, requiring heat, and filtering into the beaker B, or a receiver R, if desired to preserve from the air; also used in the filtration of gelatinous compounds requiring heat for their solution. The water-bath and stand will be found very useful for evaporating baths and other solutions.

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Stray Papers on Photography.

No. 3.—ON "PRINTING DENSITY."

BY NELSON K. CHERRILL.

I mentioned in my last paper that the condition of sunlight printing which is found to produce the best results, as far as permanence and tone are concerned, is the one also best calculated for the perfect rendering of the gradations of the negative.

It is a fact well known among photographers, that silver prints taken in a dull or diffused light are more reduced in the hypo fixing bath than those produced by the action of the direct rays of the sun. The reason of this peculiar action has, as far as I remember, never been explained; but it has an important bearing on the present subject, which will be best seen by an illustration.

It is granted that if two prints from the same negative—one printed in sunlight and the other in dull light—are fixed in the same bath, for the same length of time, that printed in dull light will be the most reduced.*

Now, if we carry out this principle, and consider that the darker parts of the negative forming the lights of the print, in obstructing the passage of the light, render its action upon the chloride paper more like the action of diffused light, we shall at once see that the high lights of the picture printed in sunlight will be more reduced in proportion than the darker shades; but we may go further than this, and on what has been already advanced we may make the general proposition that, in silver printing, the lighter of any two shades of colour or tone will be the more reduced of the two, and that the more intense the part of the negative corresponding to the high lights—or, what would come to the same thing, the duller the light in which the print is taken—the more in proportion will the high lights of the picture be reduced.

From this we may at once see that the best possible condition of negative is that which will admit of sunlight printing with the shortest possible exposure to light.

I know that many men think diffused light printing to be the best; and, when speaking of a certain inferior class of negatives, this may be the case; but I believe that I am supported by almost all who know what a good negative is, in the assertion that sunlight printing is practically, as well as theoretically, the best.

I think it will be at once seen that the intensity of a negative is a relative condition—that is, the intensity of a high light may be represented by a certain fixed number when the deepest shadow is clear glass; when this is not the case—when, in fact, the negative is fogged—the high light must be more intense, in order to produce a good print—if, indeed, that can be done at all. The density then best suited for a negative for silver printing is that which will shield chloride of silver paper, of the usual sensitiveness, from the action of the direct rays of the sun until the darkest part of the picture has assumed the deepest tint which is attainable. Is this the best possible density for the high lights of a picture which is to be printed by any other process than that of silver printing—that is, by any process which does not involve a reducing of the image formed? I think not. To take an example in the carbon printing processes: in these, gelatine, bichromate, and pigment are mixed in a certain proportion, and then, after exposure to light, the superfluous pigment is removed. I suppose from this, that it would be possible, by varying the proportions of pigment and bichromate, to prepare several papers or glasses, which, each being exposed a different time in the same light, would yield the same tone on removal of the superfluous pigment. To apply the principle involved in this supposition, we must consider that the resulting action of light upon the bichromated gelatine is to produce some change, the degree of which is dependent upon the amount of light, and the delicacy with which it can be recorded upon the fineness with, and which we can grind up pigment, so that theoretically we might print upon carbon with an exposure to light only just enough to allow the pigmented gelatine to remain black in the washing water; and as there is no reducing agent to alter the relations of the various shades in the prints, we may conclude that the best printing intensity for negatives for carbon printing is that which will shield diffused light from the high lights of the picture while the shades are obtaining the requisite amount of blackness. How long a time this must be we do not know yet exactly: it is already only half as long as silver printing in the same light, and this would give us only half the usual intensity required for carbon printing.

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* It is supposed in this experiment that the same paper and excitin bath have been employed in each case,

I have been speaking hitherto of intensity derived solely from blackness, or what might be termed absolute intensity; but there is another mode of obtaining intensity in negatives—that is, by colour, by turning them of a non-actinic colour, just where the blacks would be, using such a mode of colouration as shall ensure an exact correspondence between the intensity of its gradations and those of the negative to which it is applied. This method, which has been brought into favour by the formulæ and observations of Mr. Carey Lea, affords probably the best means of obtaining that opacity to a certain quality of light which is so absolutely necessary in order to obtain a good printing negative. Its advantages may be summed up as follows:—

1. It is applicable to negatives of but small intensity comparatively, and will, therefore, allow of the use of a full proportion of bromide—at times a most useful property.

2. The gradations which it gives are exactly in accordance with those on the original negative.

3. Owing to the fact that the intensity is gained by colour, and not by thickness in the film, fine details are rendered in the high lights of the picture with more distinctness than in the old form of negative.

With all this to recommend it, I wonder that the process of using Schlippe's salt has not come into more general favour; but whichever mode of intensification is employed, there can be but little doubt that silver printing fails to give us the full gradation of the negatives. Everyone must have noticed how much better the gradations of an ordinary print are rendered before fixing; or, if this should have failed to strike the eye, no one can avoid seeing the superiority of Mr. Swan's carbon prints to silver prints of the same negative.*

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* Since writing the above, I have read with much interest the leading article in the News of last week, on "A New Intensifying and Toning Agent," which will probably be found superior to Schlippe's salt, both in simplicity of manufacture and in excellence of result. I did not know, before reading the above-mentioned article, that Schlippe's salt was not an article of commerce. The fact that it [illegible] so is quite enough to account for photographers not using it more generally.

IMPROVEMENTS IN THE APPLICATION OF PHOTOGRAPHY TO THE OBTAINING OF PRINTED PROOFS OR IMPRESSIONS.

BY J. BULLOCK.*

It is a fact, which certainly no member of this Society will dispute, that a process of litho-photography, capable of rendering perfect gradation of shadow, together with purity of blacks and whites, the working of which shall be simple, certain, and inexpensive, would cause a revolution by no means inconsiderable in the commercial aspect of photography. When we consider the extreme accuracy and beauty of a photograph, it necessarily strikes the mind as great cause for regret that its usefulness should be so impaired, and its popularity so limited, by the expense of its production and its liability to fade. On the other hand, if we look at the cheapness of lithography, and its capability of almost universal application, we are naturally led to desire a process which should combine the truthfulness of the one with the cheapness and durability of the other.

The attainment of this result has not been thought unworthy the aim and study of minds which have rendered themselves famous in photographic history. At the same time, though pictures, extremely promising, proceeding from such study, have been produced, still we cannot be blind to the fact that, up to the present time, such results have not been considered of commercial value or of practical worth; and if to-night we prove, from specimens we lay before you, that, after months and months of close application, we have attained to an excellence hitherto unapproached, we shall not in any way depreciate the labours of our predecessors, but rather gratefully acknowledge the assistance we have derived from their experience.

It is a well-known fact that the principle of gradation in a litho-photograph consists in breaking up the half-tones of the pictures in the form of a stipple; and it may not be uninteresting to give a brief *résumé* of some of the numerous experiments we have made in this direction, and glance at the comparative value of each.

In some instances, we have endeavoured to get a grain upon the glass, previous to its being coated with collodion; which grain, when the picture shall have been taken, will form a means of breaking up the transfer print into a form capable of being placed on stone; but this method, though promising in its results, we have found too troublesome in its application. Another form of experiments was the superposition of a grain upon the negative, which we accomplished by dissolving resin in alcohol, and flowing it over the surface, which, when dry, gives the appearance of a very minute grain; or we have tried making the surface of the negative slightly adhesive, and depositing a fine powder upon it; but neither plan was very satisfactory, as in the first case the resin was too transparent, and in the other the grain was too coarse and uncertain; besides, in both, the danger of spoiling the negative.

We have also tried to produce the grain direct in the camera, by placing before the prepared plate, during exposure, a glass covered with a fine grain, the light passing through which gives to the negative a reticulated appearance; but here we were met with the difficulty of long exposure, and also having, in those parts which should have been quite dense, a pinhole appearance, not at all pleasant to the eye.

Now, leaving the negative, we tested the idea of placing a medium between the negative and paper, and of course tried all manner of fine fabrics, but found everything too coarse. Naturally, the idea suggested itself of copying upon thin sheets of gelatine, or upon talc, some granulated surface; but the difficulty of getting a substance fine enough to interpose without damaging the sharpness of the print was an insurmountable obstacle. We might continue to enumerate many other interesting experiments, but time forbids; so we will at once endeavour to bring before you, as clearly as may be, the two particular ideas we have embraced in our patent. In the first part we deal simply with the negative, and in the second with the paper, both processes being capable of most satisfactory results. To reticulate or break up the negative, we first get a piece of ground glass, or a photographic copy of some reticulated surface on glass, and place it face to face with the negative; then take a transparency from the two while thus in contact between the lens and the light; from this transparency any number of negatives may be produced, each containing a granulation so marked as to give the prints on transfer paper (which paper we intend to supply) a half-tone composed of lines or dots. Another plan is the imprinting of a grain upon an unsensitized paper, which paper is so prepared that it may be kept any length of time, simply requiring, previous to being used, a coating of bichromate of potash: this paper we intend to provide for the trade, so that scarcely more trouble is required to get a transfer ready to lay down on the stone than in the production of an ordinary silver print.

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* Read before the London Photographic Society, April 10th.

The operations connected with the production of a transfer merely consist, after the paper has been sensitized and printed in the ordinary way, in inking the surface all over with transfer ink afterwards placing either in hot, cold, or tepid water, according to the preparation of the paper, and gently agitating the surface till the ink has disappeared from those parts unaffected with light.

Having now, as briefly as possible, touched upon the different ideas embodied in the production of the litho-photographs now before you, we must beg, before concluding, to disclaim the assumption that all we have introduced to your notice to-night has been strikingly novel, but certainly desiring credit for having industriously worked out those fine details so absolutely necessary to the success of any process. We have attained to such a degree of certainty, that given any ordinary favourable circumstances, we can take a transfer from the negative, and have a successful proof from the stone, in a couple of hours time. If any pictures by a litho-photographic process surpassing ours in ease of execution and beauty of effect are in existence, then of course we yield supremacy; but having neither seen nor heard of such pictures, we conclude that hitherto they have not been produced.

This we state, that the ideas, in the exact form in which we have patented them, are not reproductions of other minds than our own, but are the result of earnest and protracted labour, every moment that it has been possible to steal from our ordinary business having been devoted to rendering of commercial value a process destined to revolutionize lithography, and very greatly to enhance the value of photography.

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DRY PROCESSES: MR. ACKLAND'S AND OTHER RECENT MODIFICATIONS.

BY T. SEBASTIAN DAVIS.*

I have the satisfaction this evening of again introducing to your notice the subject of dry plate photography, and one or two recent modifications in connection therewith.

It may be within the recollection of many members of our Society, that during the vitality of our Experimental Committee, a critical examination was made of the various methods generally adopted for preserving the collodion film in a suitable condition for subsequent development. At that time, however, attention was considerably diverted from the main subject at issue by the primary consideration of the relative advantages of the wet and dry processes comparatively estimated. This question may now be said to be virtually settled, inasmuch as all those who have had experience in both agree to the verdict that the wet is to be preferred under all favourable circumstances, but that the dry constitutes a most valuable auxiliary towards meeting the requirements of the photographic tourist. A great difference of opinion still exists, however, as to which is the most desirable method of preserving the excited collodion film in the best condition for receiving the latent image; and to this point I desire especially to direct your attention upon the present occasion.

The processes which claim our first consideration, both on account of priority of introduction and as regards general utility, belong to the collodio-albumen series. Of the various species which belong to this genus, Taupenot primus stands undoubtedly in the most prominent position. That this species has maintained the position of leading favourite for many years, and that the greater number of the best dry-plate exhibition pictures have been produced by its aid, are facts which speak greatly in its favour. The process is at least a very suitable one as a standard of comparison, and we must look for a decided superiority in facility of preparation, sensitiveness, or certainty, before we can justly place it in a secondary position. The drawbacks to its general adoption have been the proneness of the film to blistering under development, and the use of a second nitrate of silver exciting bath. I am sorry to notice that Mr. Mudd, the leading practitioner of this process, has recently stated that he himself has not met with the perfect cure; and I regret this the more, because a limited experience at the end of the last season induced me to conclude that by drying the film upon a hot water bath, and then baking, the evil may be entirely avoided. The latter operation may be accomplished with greater facility than is generally supposed. In my own practice I have a few shallow tin dishes, made of a suitable size, and placing a plate in each, I arrange them diagonally upon each other in an ordinary kitchen oven, at a moderate temperature, for about ten minutes. With this treatment blisters will only occur under very exceptionable circumstances, and then the evil may be prevented by washing the moist albumenized plate in a flat dish until the water flows evenly over its surface, and proceeding in other respects as usual. A plate so treated will retain the special characteristics of the Taupenot, and be absolutely free from any tendency to blister.

The consideration of the original collodio-albumen process leads to the notice of Mr. Ackland's recent modification of Messrs. Bartholomew and Hannaford's Fothergill process. I would call attention in the outset to the chemical identity between the first and last published collodio-albumen processes, and the close relationship in principle existing between them. The free nitrate of silver is in either instance thoroughly removed, by washing and decomposition, from the wet film, and the re-sensitizing consists in the union of albumen, nitrate of silver, in the presence of free acetic acid. The novelty, and, in fact, the only peculiarity, in connection with Mr. Ackland's modification of the Fothergill process, consists in the treatment of the film with acetic acid after the application of the albumen. The principle of the other portion of the process was critically tested by members of the Experimental Committee in the year 1861, in unison with one of my own, based upon the feature of the conversion of the free nitrate of silver into a chloride before the application of an albumen mixture. The practical and only drawbacks that experience revealed in working the latter process, under varied circumstances, consisted in a difficulty of gaining sufficient intensity in the negative, and a lowering of the intensity so obtained by the action of the fixing agent. The cause of this inconvenience I soon traced to arise from the picture being formed entirely on the surface, instead of in the body of the film, and so much so, that it would be easily rubbed off without the removal of the collodion itself. This evil may be remedied by applying a solution of gallic acid to the plate before drying, and its action will be seen to be very decided, if we cover only one-half therewith, and proceed in other respects as usual. The great difficulties encountered in the use of a partially-washed or ordinarily-prepared Fothergill plate, is the absence of uniform sensibility over the whole of its surface, and the liability of some parts to develop with greater intensity than others. To secure uniformity in these respects, an equal quantity of free nitrate of silver should be present in every part of the film at the moment of the application of the albumen, with which it is to form a sensitive compound. To understand the difficulty of obtaining this even distribution of the bath solution, take an ordinary wet plate, and, having washed it carefully in a flat dish, expose and develop it. The unevenness of sensibility, which will be rendered apparent by this proceeding, naturally suggested to myself the desirability of a complete removal of the exciting bath solution from the pores of the film. This can be accomplished most readily by washing the plate freely in common water, allowing it to remain some minutes in a solution of salt and water, then treating it with ordinary water allowed to fall on the plate with some degree of force. If the plate has been thus washed in water containing a chloride only, it will still retain its actinic sensibility; if with a diluted solution of an iodide, it will have lost this property. In the one instance we shall have iodide of silver precipitated in the presence of an excess of an iodide salt; in the other, iodide plus chloride of silver. Taking a plate in the latter condition, it becomes necessary, if we follow the Fothergill method of preparation, to apply the albumen to the film in combination with nitrate of silver, and retained in solution with an excess of ammonia. In order to equalize the distribution of the mixture over the whole area of the plate, it is desirable to pour it on and off several times from different parts. The plate having now to be washed, the uniformity of sensibility already attained is unfortunately disturbed in consequence of the soluble compound being unequally removed from the body of the film.

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* Read before the South London Photographic Society, April 12th.

Many and varied experiments made by the members of the Experimental Committee upon the direct combination of albumen, nitrate of silver, and ammonia, led to the conclusion that the compound applied to the washed collodionized plate has a direct tendency to produce a negative having a semi-opaque deposit over its whole surface. It was on this account that the Experimental Committee did not recommend the process, as introduced to their notice by Mr. Hannaford, for general adoption, and in consequence of which Mr. Ackland has, I presume, introduced the modification of a final wash of acetic acid. I regret, however, to state that I am unable to report that this additional treatment is thoroughly efficacious, or that the special unevenness characteristic of the ordinary Fothergill process is satisfactorily overcome. In pursuing the experiments which have led me to arrive at this inference, I have found that the strength of the albumen, nitrate of silver, and acetic acid may at least be doubled with very great advantage. I have to suggest, however, the substitution of a 3-grain solution of gallic acid applied to the plate after the albumen has been washed away, instead of the diluted acetic acid. With either of these alterations, I can confidently recommend Mr. Ackland's modification as the best and most reliable method of practising the Fothergill process.

Reserving the consideration of the applicability of the alkaline development to this particular process, with the passing observation that the reducing power of pyrogallic acid in combination with an alkali is applicable to almost every process, I proceed briefly to epitomise the result of some recent experiments with simple preservative dry-plate processes.

A simple preservative agent I consider to be a solution of any substance or substances in water which do not produce any marked chemical reaction with free nitrate of silver, but having been introduced in the pores of the collodion film, preserves it in a suitable condition to receive the latent image and assist its development. There are many ordinary fluids of an organic character, in daily use, capable of fulfilling these conditions, and of those that I have tried at different times, ginger wine, malt vinegar, and raisin extract solution are especially efficient. Any of these simple articles fulfil the necessary requirements, and the second is a convenient and ready-made preparation for the ordinary "malt process." The raisin extract solution has the peculiar property of being absorbed at once by the film in sufficient quantity to produce the necessary effect, and the plate may therefore be washed after its application and before dessication. An interesting paper on this process, and in which the author, Dr. Schnauss, makes some observations upon the action of the raisin extract solution upon the collodion film, appeared in a recent number of the Photographic News; and I notice that the writer uses the extract of the same strength as recommended in my original communication. Under certain conditions of collodion or bath a slight want of transparency in the shadows occurs; but I have just found that this defect may be overcome by the addition of a little malt vinegar to the preservative; and this addition has the further advantage of preventing decomposition in the infusion itself. The directions I should recommend, therefore, as a simple preservative dry plate process, are as follows:—

The plate to be covered with a bromo-iodized collodion, excited in a silver bath as used for the wet process, washed in a flat dish in three changes of ordinary water. The film is now to be covered twice with the raisin extract solution mixed with five per cent. the volume of malt vinegar, then washed in a flat dish with a suitable quantity of water, dried, and exposed as usual.

I am now brought, in conclusion, to the most difficult problem in connection with dry plate photography—viz., which known process offers the greatest number of advantages, and is best adapted for general use? To this I can only indefinitely reply to the effect, that of all processes yet devised, there is not one capable of yielding better results on small-sized plates than the Fothergill and its modifications, but that these are the most liable to give a profusion of photographic nonentities. I incline, therefore, to advise the use of the simple dry preservative process described above, if worked in conjunction with, or as an adjunct to, the wet; if without reference thereto, and upon large as well as upon small-sized plates, the original "Taupenot."

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ON THE ARTISTIC COLOURING OF PHOTOGRAPHIC PORTRAITURE.

BY SCOTT ALEXANDER.*

The patronage which the Photographic Art has received from all classes of the community is sufficient argument to urge in favour of its being "the limner of the human face divine." Accurate in its delineation of the most minute detail, rapid in its sketching, even to instantaneity, it catches the happy but fleeting expression of the features before they have time to settle into dormant repose, and that, too, as one grand whole, employing, as it does, its thousands of mysterious and delicate pencils, at one given moment, to produce the wonderful result, not in isolated or transient gleams, difficultly raised, and sometimes of too momentary occurrence to be sketched by the anxious wielder of the brush. By the combination of those two grand essentials in the formation of a picture we have, if the subject be properly posed and lighted, a life-like portrait, such as no artist could ever produce. But, unfortunately, these peerless productions in point of likeness lack that which nature, with lavish hand, beautifies all her work with, viz., colour; and, although great effort has been made by the most gifted minds in connexion with photographic science to secure this great desideratum, it is to be regretted that up to the present period little has been done to raise our expectation that ultimately we shall be able to produce photographs in colour, a feat which, if once accomplished, would render all attempts at hand-colouring but miserable daubs: as, if those beautiful and unapproachable tints, so delicate as to "mock the gazer's eye," with which nature illuminates the features of her grandest design, be copied with that truth and accuracy exhibited in the sun drawing, they will put to blush the finest pictures yet produced by ancient or modern genius.

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* Read before the Glasgow Photographic Society, April 12th.

But, lacking this important characteristic, there is a large field opened up for the display of artistic colouring, from the popular carte to the life-sized portrait, either as miniatures on ivory, opal glass, &c., or as enlarged photographs on canvas, as in the specimens now before you. And as there seems to be a desire awakened on the part of the public for coloured photographs, it is earnestly to be desired that the photographer and photographic colourist will see it to be their duty to have such executed in such a manner as to afford emolument and credit to themselves, nor let those beautiful arts sink into secondary importance through carelessness or a desire to pander to false taste, though possibly by so doing they may be adding to their pecuniary interest. The great accuracy and truth of the sunbeam's finished works should become to the real colourist the text for his conduct in elaborating with colour its fine sketching; but unfortunately, at the present time, instead of this example being followed with reverence, it seems to be wholly discarded, judging from the various mechanical methods of colouring offered as royal roads by which the photographer may at once become a colourist, and which it is to be feared have led astray too many of the votaries of the art, tempting them to varnish the surface of the photograph, and dust powder-colour thereon; or to wax one proof to render it semi-transparent, and place a glass recess between it and another proof glaringly coloured, and thus, by bringing the two together, produce something like a coloured picture; or to simply wash over the picture with gummed colour, regardless of art, as in a valentine or common coloured French lithograph. The photographer, by encouraging such inartistic methods of colouring, does great damage to his own art, as such trumpery effects detract from the desire to raise the standard of taste amongst his customers and the public. And since photographers, more than any others, have it in their power to materially influence in the cultivation of a love for fine art, it is unfortunate that they should—perhaps without much consideration of the subject—condescend to encourage the vendors of such puerile imitations, which afford no satisfaction to the artist, and only tend to lower the taste of his customers.

To say the least of it, there is a warmth and life-like glow given to the photograph when judiciously coloured, that it is not possessed of as rendered in sombre black and white; but to colour well requires much patient painstaking. The eye must be trained to keen observation of the actual colour of nature's subjects, whether exhibited in the glowing blonde, the warm brunette, swarthy health, or pale beauty; in the preparation of the colour to a suitable consistency on the palette; careful study of the various gradations of tints to produce an harmonious result; a cunning hand, possessed of delicate touch, necessary to emulate in its manipulation the infinitely gradual tints and shades of the fine photographs; or, in other words, the power to render such in colour. It is, therefore, obvious that an artist, even to colour photographs, cannot be made a proficient in a short time, as if he be deficient in any of the above requisites, then the sun picture, instead of having a "grace" added to it, is despoiled of its intrinsic value, and can only be likened to nature looking through an artificial mask. So difficult is the task of rearing a good colourist, that even the accomplished artist feels his inability in endeavouring to impart the information necessary to those he is wont to train in the knowledge whereby he is enabled to produce almost inimitable results. With the best intention he fails, feeling he cannot impart that which intuition bestows, and discovers that there is something more required than pigments, palette, and brush in the making of an artist. But when the colourist, solemnly imbued with the truth of the photograph, and watching the fine management of its monochrome from its high light to its deepest shadow, can translate the same, with a keen desire to imitate its inimitably delicate gradations into colour, then, indeed, does the photograph, as rendered on the ground glass of the camera, serve as the true guide to the miniature colourist, and the result is a beautiful conjunction of nature and art to produce a faithful resemblance of the human face. Of course the taste of the artist will dictate to him to soften some of the harder lines rendered in the proof by the peculiar colour of the original, or the furrows which time indents on the forehead, and which, by the concentration of the lines, may really appear deeper in the photograph than in the original. Without attempting to go deeply into the philosophy of colour analytically or synthetically, it may not be out of place to give you, however slight, an idea of how to proceed in colouring a photograph.

It is indispensable that you wash the proof well with a sponge; or better, and always at your command, take your tongue across it, in order to remove any traces of grease or starch; as far as my experience goes, the latter method is the more preferable. In rubbing down the colour on the palette, give all attention to the manner it is softened with the gum and water added; if you rub with careless quickness, the colours are rendered useless, owing to the numerous air bells that rise, which, when applied to the surface of the picture, give it a coarse, inartistic, and anything but pleasing aspect. To colour a good clean print, you must, in the first place, wash in the face; use as much gum as will bring it nearly, although not quite, to the same gloss as the albumen surface; this wash to be composed of, for a person of ordinary complexion, a combination of rose madder and Indian yellow, or Venetian red alone; with these colours, judiciously applied, you can produce any complexion, from the brightest glow of health to the most sallow; the shadows to be warm, and in every case glazed even more than the albumen surface. Sepia, neutral tint, burnt umber, chrome yellow, and ivory black, if properly used, will give the blooming graceful curls of the gentle queen of hearts, or the sere locks of the tottering dame of seventy, that life-like brilliancy which is characteristic of health or decay. Should the photograph be clean and well defined, for draperies and carpets, the colouring of which should ever be subservient to the figure, use transparent; but if the picture be deficient from under development, use opaque colours. Of transparent, for such purposes, use the following:—Crimson lake and burnt sienna, Prussian blue and Indian yellow; also chrome yellow and Prussian blue make an excellent wash for draperies, although not purely transparent; for backgrounds, which should ever be made to softly recede from the figure, the following colours may be used with much purpose:—Cobalt blue and a little Chinese white, which give a good effect, and altogether a pleasing result, vignetting it to your own taste with sepia or other browns. By way of finish, or to relieve an otherwise sorry production, it is sometimes necessary to make what is termed an introduction—that is, a side opening in the background, where a neat landscape may be lightly sketched and coloured, comprising water, land and sky, or a bit of woodland; such sometimes give a freshness to an otherwise dull picture, or serve to exclude some of those hideous backgrounds so much displayed in cartes generally; but in putting in draperies, carpets, plain or pictorial backgrounds, let them ever be subdued, and in quiet harmony with the figure, the head of which should always be the principal attraction for the eye.

With these rather incomplete remarks I hope you will be satisfied, as I assure you my forte does not lie in writing papers, nor am I capacitated to express in words that which I can render in colour. The specimens I now show will, in some measure, serve as my apology, and embody my idea of what artistic colouring, as applied to photographs, ought to be.

PHOTOGRAPHY ON SILK.

BY H. COOPER, JUNR.*

The following formula for printing on silk is the one that, on the whole, has given me the greatest satisfaction, and is identical with the one published by me two years ago.

Pour 20 ounces of boiling water on 100 grains of chloride of ammonium and 60 grains of Iceland moss. When nearly cold, filter, and immerse the silk in it for 15 minutes. To sensitize, *immerse* the silk in a 20-grain solution of nitrate of silver for 16 minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of cardboard a little smaller than itself, by turning the edges over and fastening with small bits of gummed paper. Slightly overprint. Wash in two or three changes of water. and tone in a gold bath made thus:—20 ounces of water, 2 drachms acetate of soda. 4 grains chloride of gold, and a few grains of common whiting. Filter, and keep for 24 hours before using. Let the prints be toned slightly bluer than they are required to be when finished. Rinse them in water, and fix in a solution of hypo., 4 ounces to the pint of water. 20 minutes is ample time for fixing. Wash well.

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Proceedings of Societies.

South London Photographic Society.

The usual Monthly Meeting of this Society was held in the City of London College, on Thursday evening, April 12th, Mr. Sebastian Davis in the chair.

The minutes of a previous meeting having been read and confirmed, Mr. E. Bullock and Mr. James Bullock were elected members of the Society.

The Chairman said he had received a letter from Mr. Jabez Hughes, protesting against the tone and character of the paper read by Mr. Wall, at the last meeting, as being calculated to endanger the cordial feeling and prosperity of the Society.

Mr. Wall asked if a member had a right to comment upon the proceedings of a meeting at which he was not present.

Mr. Johnson asked if it were not an unusual thing to write about the proceedings of a former meeting.

The Chairman said that, in order to avoid the re-opening of an unpleasant subject, he would regard the letter as addressed to himself, and would not therefore read it to the Society.

The Secretary asked if it should be placed on the minutes, and stated that there was precedent, he believed, for such a thing. After a little conversation, the subject dropped.

Mr. Cox exhibited and explained his Patent Box Tent.

The Chairman then called attention to several volumes sent by Mr. Ross, to illustrate the working of his new doublet, showing freedom from distortion, and including a wide angle. The lens was, he believed, now well known, and these pictures, by Collins, Frith, and others, would well illustrate its results.

Mr. Ross called attention to a print by Mr. Webber, taken with a doublet of 4½ inches equivalent focus; the print being 7 inches by 5 inches, and including 80° of subject.

After the nomination of some officers to be elected at the June meeting,

Mr. Wharton Simpson took the chair, which was vacated by

Mr. Sebastian Davis, who then read a paper on "Dry Processes: Mr. Ackland's and other Recent Modifications" (see p. 186). Mr. Davis handed round a series of fine negatives illustrating various points named in the paper. After some conversation,

Mr. Johnson, referring to the recommendation to use malt vinegar, said it frequently contained sulphuric acid, a certain amount being permitted by the excise.

Mr. Davis said it was not permitted to contain more than one part in a thousand; but many houses manufactured it quite pure, and guaranteed the absence of sulphuric acid.

Mr. Russell Manners Gordon asked if Mr. Davis had found Mr. Ackland's modification more rapid than the Taupenot.

Mr. Davis said they were nearly alike, but the Taupenot plates took a longer time to develop, and one was as easy to work as the other.

The Chairman called especial attention to one of the plates, which illustrated the action of a final wash of gallic acid, in giving brilliancy, vigour, and cleanliness. He might also add that he had found it gave great keeping qualities.

Mr. Davis said the keeping qualities conferred was an essential point in the action of gallic acid.

Mr. Howard said that Mr. Davis and himself had tried many experiments together, and he could confirm the remarks Mr. Davis had made. He thought that a number of persons sticking to one process and comparing notes was a great source of success, and he believed that much of the success of the men of the North with the collodio-albumen process was due to this unanimous action. Referring to his own long practice with the Fothergill process, he said that the question of much or little washing should be chiefly determined by the amount of keeping-qualities required. If a plate were not required to keep, a slight washing would do, and the plate would be most sensitive. If long keeping were required, the plate should be well washed. He always washed well if he required the plates to keep as much as a fortnight. He did not like washing under a tap, as that was apt to cause stains and patches of insensitiveness. He washed well in two successive dishes of water, then applied the albumen solution, and next the gallic acid solution. Plates so prepared would keep eight weeks, and then develop bright and clean. He had tried Mr. Ackland's modification, and thought it more sensitive than Mudd's formula, but the pictures were harder and less detailed in the shadows; the result was, however, encouraging, and he would try it further. One advantage of plain pyro and of alkaline development was the possibility of getting the image perfectly out without intensity, and then intensifying at leisure. He had found, in adopting Mr. Mudd's method, using plain pyro, about 4 grains to the ounce, that all the detail could be secured without risk of the intensity getting a-head of detail. He concluded by again recommending amateurs to stick to one process, and to work in communion with each other, and so secure that combination which leads to the highest success.

After some further conversation,

The Chairman asked if any one had tried hot development.

Mr. Howard had found it difficult to manage, and apt to cause fog.

Mr. Johnson had seen M. Ferrier use heat in development. His process was very rapid. He (Mr. Johnson) believed it to be the Taupenot process with hot development.

The Chairman explained Mr. Mudd's practice, and said that he could get a negative with thirty seconds' exposure, with hot development, which would require three minutes with cold.

After some further conversation on the subject,

Mr. Davis said he preferred the ordinary development, wherever he could give sufficient exposure.

Mr. Cox said that he had found heat invaluable even with the wet process, when rapid results were required in a dull light, and related some illustrative cases. It was a material aid in instantaneous photography in poor light, in some cases reducing the exposure from minutes to seconds.

Mr. Ross said that hot development was practised in the very early days of photography. He remembered Mr. Reeves, whose name would be familiar to the readers of the News as an occasional correspondent, used heat in developing albumen plates many years ago.

After some further conversation,

Mr. Johnson asked if Fothergill plates would bear the surface rubbing during development, to remove fog, like collodio-albumen plates.

Mr. Gordon said a Fothergill plate prepared with equal parts of albumen and water was as hard as a Taupenot plate.

After some further conversation, it was proposed that a few of the members should associate themselves to work out some one process, and eventually state the result of their labours to the Society.

It was announced that at the May meeting, Mr. Edwin Cocking would read a paper "On the particular kind of Ar Study to which photographers should give their attention."

The proceedings then terminated.

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* Read before the London Photographic Society, April 10th.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, April 18th, 1866.

I HAVE just received from my friend, Niepce de St. Victor, a very interesting communication, especially when considered with regard to the person from whom it comes and to the circumstances under which the operations it describes originated.

The matter in question relates to a process of engraving on copper, which involves at least one mode of silvering plates very simple and quite new. The author, M. Mialaret, is a Frenchman, who left his native country when fifteen years of age, and now lives in a remote corner of Louisiana, near St. John Baptist. Since the beginning of the war in America he has not only remained without news of the progress made in art and science, but has even been deprived of the means which might have aided him in his researches, and has also been unable to procure the most indispensable substances, even *salt* having been for a time prohibited. In the midst of the distress caused by the suffering of his family, who were frequently compelled to live solely on Indian-corn bread, and were struck by disease and death, he found no relief or consolation except in his researches and in the hope of rendering some service to science, to which he is passionately devoted; so much so, indeed, that although his discovery is necessarily still incomplete, he unhesitatingly offers it for the study of experimentalists placed under happier circumstances than himself.

Is there not something very affecting in this story? And will not the readers of the PHOTOGRAPHIC NEWS hail, with heartfelt sympathy, these efforts of a scientific explorer, equally ardent and disinterested?

M. Mialaret's process may be used to obtain photographic images on copper, which may, in their turn, be transformed into engravings. Take a thin plate of copper perfectly even, and polish it very carefully, if you intend to etch it afterwards. Suddenly plunge this plate, when quite dry, in the following solution:—

Sulphate of copper	125 grains
Sea salt	75 „
Water	2 ounces.

Sharpen this liquid with a few drops of any acid whatever. After an immersion of from thirty to sixty seconds, or even longer, the plate must be withdrawn from the bath, washed in abundance of water, well dried with a linen rag, and then rubbed vigorously, with soft flannel, until it acquires a good polish. In this state the plate presents an appearance varying from bright red to violet, without this difference of tint perceptibly affecting its sensibility. These different operations may be performed in the ordinary light of any apartment. To produce the impression on the plate, place it in a printing frame behind an engraving, or a negative on glass, and expose the whole to solar radiation. Under a bright sun, from five to ten minutes will suffice, according to the opaqueness of the negative. When the sky is overcast, the plate must remain exposed for an hour, or even longer. After receiving the impression, the plate will remain some days without any perceptible change, provided the atmosphere be dry, and it be not exposed to too strong a light. But, being very hygrometrical, if the atmosphere be damp, the plate is liable to be covered with greenish efflorescences, and then it becomes unfit for fixing. This operation ought, therefore, to be performed on withdrawing the plate from the frame. For this purpose, plunge it in a solution of hyposulphite of soda, with the addition of a few grains of chloride of silver. Photographic baths which have been used for fixing proofs on paper may be utilized for this purpose, providing they contain no salts of gold. The solution should always be well filtered, that the progress of the operation may be better watched. After a few seconds' immersion, the proof is seen to whiten in all the red tints; the shades assume a violet hue, and at last turn black. When this occurs, the plate must be taken out and violently agitated in a basin of pure water; after which the black deposit forming the shades may be removed, unless the operator chooses to let it remain. In that case, the plate must be well washed, and then dried rapidly over a spirit lamp giving a wide flame. As the black parts of the image are composed of dust which comes off with the least rubbing, they are protected by covering the plate with a transparent varnish. The engraver may then begin his work without fear. No process can give him a more faithful copy of the design he wishes to transfer to copper. But if the plate is to be etched, the black must be removed at the moment above stated, the plate washed under a strong jet of water, and plunged without drying into the liquid chosen as a mordant. This liquid ought to act on the copper without attaching the silver, but all substances must be avoided which cause a disengagement of gas, the boiling of which would destroy the thin coat of this last-named metal.

The following is the formula which the author found to answer, but the nitric acid may be replaced by sulphuric with the same results:—

Nitric acid	1 part
Saturated solution of bichromate of potass	2 parts
Water	5 „

To use these solutions, varnish the back and edges of the plate, and then plunge it into a quantity of liquid sufficient to cover it entirely. When the solution turns blue, add more of it, without touching or moving the plate, and continue the action of the mordant for a whole day, or even for two, according to the temperature. The author has employed iodine in combination with the bichlorate of potash or nitric acid. In that case, it is advisable not to rub the plate to remove the blacks. M. Mialaret strongly recommends the trial of this formula. It is the only one which he found to give half-tints freely. Moreover, it produces an engraving in relief; that is to say, the plate is bitten only in the parts which would seem to be protected by the silver that covers them. By the galvanoplastic process, a reversed proof may easily be obtained, in which the blacks will be hollow, and the impression given the right way. On the contrary, with mordants which bite the copper and do not affect the silver, an incised engraving is at once obtained, but it can only give figures inverted as to the position of the parts. Biting with iodine, therefore, offers a great advantage, which is balanced, however, by the slowness of its effects. The bichloride of copper may also be employed, well diluted with water, and combined with an equal portion of bichromate of potash. But this solution only suits for the reproduction of engravings. Lastly, the chemical action of the pile may be employed. By attaching the plate (previously immersed in *very acid* solution of sulphate of copper) to the positive pole of a pile in activity, an engraving of considerable merit may be obtained in twenty-four hours. But it is essential that the plate should occupy a horizontal position under the copper which serves as a negative electrode, otherwise the silver would be detached, and the plate would be bitten over its entire surface. The operation may be reversed by connecting the plate with the negative pole. In that case, it gets covered with copper, but only in the parts corresponding to the blacks. To succeed perfectly, it is indispensable that the black be not removed, and that the plate, after the washing which follows the immersion in the hyposulphite of soda, should have remained for some hours in a neutral solution of sulphate of copper.

Such are the results obtained by M. Mialaret. If they do not completely solve the problem of engraving, they at least supply more highly favoured experimenters with very valuable information.

A distinguished amateur, M. A. de Constant Delessert, has just communicated to the Photographic Society of Marseilles a process of printing which appears to present great advantages in an economical point of view.

M. A. Delessert relies on the principle indicated by Dr. Schnauss, that in order to obtain good photographic proofs (positives), nothing more is required than that the silver be in excess over the salt in the preparation of the sensitized paper, and he likewise appeals to an analysis by M. Pollack, from which it results that the white of egg naturally contains sufficient salt to effect the combination with the silver. He therefore proposes a process, tried by himself, of which the principal and very important merit consists in a great saving of silver.

The formula is—

Pure nitrate of potash	32 grammes
Pure nitrate of magnesia ...	32 gr.
Nitrate of silver	9 gr.
Water	500 gr.

Or a bath with barely 2 per cent. of silver.

As for the paper to be used, it is albumenized *without salt*. M. A. de Constant Delessert recommends, as excellent, the quality manufactured by M. Marion, of Paris, called *inerte coagulée*.

This communication was accompanied by a number of proofs, which were shown to the persons present, most of them obtained with M. Meynier's ammoniacal salts of silver, of which the proportion used is 8 per cent.

M. Faye has presented to the Academy several very remarkable photographs of the sun, for which he was indebted to the kindness of Mr. Warren De La Rue, as well as the positives which M. De La Blachière had taken for him with M. Liebert's enlarging apparatus. These proofs, greatly magnified, very clearly show many interesting details. Two of them, relating to one and the same spot observed at two days' interval, are well adapted for stereoscopic vision, the application of which to the heavenly bodies is also due to Mr. Warren De La Rue.

Ernest Lacan.

A SUGGESTION TO PORTRAITISTS.

Sir,—If you will allow me space, I will bring under my fellow photographers' notice something that, if not absolutely *new*, will, I think (which is of more importance), give an impetus to business.

I would suggest that the leading photographers introduce whole-plate pictures, full lengths and other styles, mounted on very stout cardboard, with not more than one inch margin, the cardboard to be so stout as to go safely through the post with a simple wrapper. If celebrities were published the proposed size, it would tend to popularize it.

The album-makers should also be requested to make albums so arranged as that one page should hold one of the "cabinets," and the other four C. D. V's.

I feel quite convinced that if for once photographers would combine and push these pictures into notice, a large demand would soon arise.

If agreeable, I may at some future time address you upon the so-called copying companies.—I am, sir, yours respectfully,

A Country Photographer.

PHOTOGRAPHERS' AID SOCIETY.

"Homo sum, et nihil a me alienum, posse esse puto."

Sir,—Your feeling remarks and admirable suggestions relative to the necessity of provision being made to meet such lamentable cases as that referred to in the following communication, by the establishment of a permanent institution, whose gates would be open to all meriting or claiming relief, deeply interested me, and I could not rest satisfied until I had given expression to my feelings. To these feelings I humbly desire to give a *living* form by *practical* aid, so far as my means will enable me.

The imperative necessity of establishing a Relief Fund, in order to mitigate the sad sufferings of members of our profession when unhappily overtaken by illness, and its sad concomitant, poverty, was never more painfully demonstrated than in the introductory article of your number for last month. The date to which I refer is March 23rd.

Absence from home, for a short period, alone prevented me from relieving my mind by an expressson of the deep regret and heartfelt sympathy I experienced on reading the extract from the *Standard* of the 12th ultimo.

Could anything that even painter sketched, or novelist pourtrayed, be more harrowing than this incident in real life? There lay, prostrated by illness, protracted pain most acute, poverty most galling, yet the while bravely bearing up against the triple evil, a gentleman by birth and education. Utterly paralyzed by acute rheumatism, lay that "pale, intelligent man," on a rough bed, whose scanty covering was supplemented by the addition of ordinary clothing, doubtless quite as scanty. Hungry children, and a wife worn out with want and watching, wait upon him. The Poor House doles out a morsel of bread, and a little money—little, indeed; still for the time it keeps the lamp of life flickering. His children cry for bread. That man is the son of a barrister, and a student of University College.

Enough. No matter how humble his origin, or in other respects, how defective his education. He is a respectable member of our calling, and, therefore, has a claim on all who have

> "Hearts which, like the needle true,
> Turn at the touch of others' woe;
> And turning, tremble too!"

But sir, let us not theorize, or sympathize, but act and do. Meantime, let us rush to the rescue of the unfortunate confrère, and, having done so, steadily direct our attention to some permanent institution for the relief of unhappy sufferers, in a like predicament, where they may not labour under (as has been said) the disadvantages of "desultory charity" on the one hand, or loss of "self-respect" on the other.

Literature and the Arts—the Drama and Music—most prudently do not disdain, but, on the contrary, willingly avail themselves of, the great benefits of such establishments.

The Dramatic College has been a great success: why not the Photographic Fund—that is to be?

Meantime, Sir, I enclose my card, with a trifle to relieve the immediate necessities of the unfortunate gentleman, promising that if 100 of my brother professionals subscribe £5 each towards the foundation of an establishment for the relief of poor, sick, or indigent members of our profession, I shall be most happy to enrol my name amongst the number.—Yours truly, C. H.

Wolverhampton, April 11th, 1866.

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Photographic Notes and Queries.

Improved Head-Rest.

Sir,—I beg to submit to your notice two photographs of a head-rest which has been found useful in my studio. Its chief merit consists in the addition of a *swivel* to the ordinary form of head-rest, thus giving greater scope for the adjustment of the head part without necessarily moving the stand, and allowing the upright stem to be *easily hid*, even in the cross-legged leaning position, which cannot well be done with the upright rest in ordinary use.—Yours truly, James Harrison.

Leeds, April 11th, 1866.

[So far as we can judge by the photographs sent, the head-rest described possesses decided advantages over the common old form of rest.—Ed.]

Grinding Lenses.

Sir,—You are sometimes asked if there is a work on "Grinding Lenses." There is information on that subject in "Holtzapffel's Turning and Mechanical Manipulation," the information derived from the late Mr. A. Ross. This information is in the third volume, which is devoted to abrasive processes. The price of this volume is, or was, 15s: I do not know where it is to be had now.—Yours faithfully,

Guernsey, April 14th, 1866. W. Marquand.

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Talk in the Studio.

"Your Future Husband."—A correspondent informs us that since the notice in the News of one of the uses of surplus card pictures, the Greek Street Astrologer has made a move, altered his name, and requests the sixteen stamps, required for a true carte of any person's future husband or wife, to be forwarded to some villa in the neighbourhood of Notting Hill.

Gelatino-Iron Developer.—A correspondent, referring to the difficulty mentioned at page 119 of the News, says:—"I believe if Mr. Bartholomew will wash his negatives thoroughly with moderately warm water before drying and varnishing, he will get quit of the irritating patches he complains of."

Removal.—Our readers will learn, from an announcement in our advertising columns, that the old-established and well-known manufacturers of photographic and philosophical apparatus, Messrs. Murray and Heath, have removed from Piccadilly into more commodious premises, situate at 69, Jermyn Street.

The Origin of the Carbon Process.—Mr. Swan, referring to our remarks on Mr. Davies's letter in our last, says:—"It is a great happiness to think that 'those who know me, know' that I could not be the 'gentleman from Newcastle' referred to by Mr. Davies, nor have any connection with him; but as I am not personally known to many of your readers, it may be well to state, that I have never had communication of any kind, direct or indirect, with Mr. Davies, nor have I in any way been made acquainted with his ideas or doings. With regard to the general matter of his letter, I feel glad to recognize in him a fellow-worker and inventor, and grudge him none of the honour to which he lays claim."

Mr. Peabody.—A magnificent life-size portrait of Mr. Peabody has just been completed by Mr. Mayall, for presentation to the Peabody Institute, U.S. It is enlarged from a card picture, and then coloured in oil; it is beyond comparison the finest result of photographic enlargement we have seen. We hope shortly to publish some details of the method by which Mr. Mayall produces the extraordinarily fine enlargements he has recently exhibited.

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To Correspondents.

⁂ Readers will please observe that each copy of the present number contains a litho-photograph by the patent process of Messrs. Bullock Brothers.

J. S.—The question is one chiefly of lighting and exposure. The pictures to which you refer are well lighted and fully exposed. The one enclosed is not well lighted, and slightly under-exposed. The lens, moreover, does not cover properly.

Ignoramus.—Opal pictures may be coloured either with powder-colours or water colours. You will find some useful hints on the subject on page 361 of our last volume; also in Newman's shilling "Manual of Harmonious Colouring Applied to Photographs." For some purposes, the rose-tinted glass may give a good result.

New Toy.—Probably a triple, but we do not know certainly. A triple would do the work. Your description of a picture developed by merely washing a piece of blank paper is too indefinite to enable us to determine what the process may be. Inhaling the fumes of iodine would be injurious.

Bendigo.—You will find a diagram on page 575 of our last volume, showing the mode of using a portrait lens with a magic lantern. 2. Newman's "Harmonious Colouring Applied to Photographs."

L. N. G.—We do not know of any method except advertising or applying to a second-hand dealer. We do not know much of the establishment you name; but, so far as we know, it is respectable.

Alfred S. Cooper.—The negative is chiefly at fault; it should be much more intense. It would be impossible to get a print of fine tone with such a feeble negative. You do not state what toning process you use. The print is imperfectly fixed, the hypo is either weak or old, or the print has not been long enough immersed. If you want detailed advice, state exactly what you do, and we will point out any error.

Photo Juvenis.—You may either add a little chloride of gold to the ordinary fixing bath, and tone and fix at once; or make a bath of *sel d'or*, dissolving one grain of chloride of gold in an ounce of water, and add this to three grains of hyposulphite of soda dissolved in three ounces of water; and then fix afterwards. You may wash before toning or not, as you choose; but it is better to do so. An edging of varnish applied to the plate before coating with collodio-chloride is not of much use, although an edging of albumen, so applied, is. An edging of varnish, or solution of wax, applied before toning, answers best; if the film leave the glass, then it is the result of careless manipulation. I the image be too weak after fixing, print deeper.

G. McMurdie.—The formula you are using gives excellent results when properly managed. You may, if you choose, use half the proportion of iodide, and double the proportion of chloride. This will give you less sensitiveness, but less risk of decolouration. You may also decrease risk by using more acetic acid in the developer, the proportion depending much on the temperature, &c. The best lens for the purpose is a triple; but of those you name, your card lens. The chief faults in the print enclosed are not so much due to formula as manipulation, &c. The negative appears to be altogether unsuited for the purpose, being much too dense and hard. The exposure has also been insufficient; and the print appears to have been exposed to too much light before fixing. Keep your oxygen in the gas bag.

J. H. W.—The term cabinet size, as applied to photographs, is a very indefinite one; it is generally applied to pictures about 8 by 6 or 7 by 4½ inches.

S. Stace.—The spots are in the paper.

Nottingham.—The new portrait triple is much more rapid than the ordinary triple, and will, we should think, be well suited for the purpose you require.

Magnus.—Apply to a dealer in philosophical instruments, such as Mr. How, Foster Lane; Horne and Thornthwaite; or Negretti and Zambra.

W. C.—The paper prepared for the Wothlytype process, either by the Company or by Mr. Sanford, will answer. The use of the paper for collodio-chloride printing does not interfere with the Wothlytype patent. 2. We have no doubt that the collodion you mention will answer.

N. W. B. C.—The question is one we cannot undertake to decide; it is simply a commercial matter between the dealer and yourself. If the lens be an imperfect one, a respectable dealer will doubtless exchange it; but you should adopt his advice, and try it. We do not see any reason for obtaining the permission of the Rector to photograph the exterior of a church, but it is not likely that the permission would be refused if you wish to obtain it. To effect a registration, you must fill up the form provided for the purpose, and forward it, with fifteen stamps, to our publisher. You will find full particulars in our Year-Book for 1865. We regret that our engagements do not permit us to write private letters on such questions as those in your letter.

T. Revon (Haute-Saone).—A few weeks, so far as we at present know. We have heard of them keeping well for three weeks. 2. Decidedly superior in giving detail in green foliage, and gives more delicacy and harmony, and also more certainty. See the paper of Mr. Davis in this number. We hope shortly to publish the results of some valuable comparative experiments. 3. So far as we know, the tables are trustworthy; but we have not examined or tested them sufficiently to speak with certainty.

C. T.—We shall await the arrival of the specimens. The patent to which we referred was for photographing on uneven or concave surfaces.

A Subscriber.—In Mr. Archer's original manipulations, he employed a very tough collodion, which could readily be lifted from the glass: a piece of damp paper was placed on the film, a little within the upper edge, which was then turned over the paper, and then the whole rolled on a glass rod. He subsequently patented a process in which a solution of gutta-percha was poured over the dried film, and the whole subsequently lifted off. This method is still practised by many with success. You will find in our eighth volume a process, by Mr. Swan, of transferring by means of gelatine, which answers admirably.

T. E.—You can procure a camera with the arrangement you require of most of the camera makers. Mr. Meagher, we know, makes them. We do not know the price.

J. F. Trull.—Thanks for the exceedingly fine opal pictures. They are both very good indeed; that of the gentleman, perfect. It is very satisfactory to us to see such excellent results produced by our process.

Reform Bill.—The best solar enlargements are those produced by direct printing; but the exposure is long, and requires continuous sunlight. The usual direct printing formula may be employed. It is quite possible to produce excellent results by development; but that process requires, of course, practice to succeed. The formulæ in the Year-Book for different years, both that of Mr. Smyth and that of Mr. Woodbury, give excellent results, many examples of which we have seen. It is desirable to expose the paper wet, and as the exposure is short, it is easy, if expeditious manipulation be employed, to develop before the paper dries. The question of brushing, floating, or pouring on the developer is purely one of manipulation, and must depend upon the skill and experience of the operator. If you have not had much experience, and the paper is dry before you can develop it, pour on a little distilled water, and moisten the surface all over; then add this to the developer and flow it over the surface; by this plan you will avoid stains. Take especial care to keep the back of the paper dry; to be cleanly; and to prevent any trace of actinic light reaching the paper either in preparation or development.

J. J. C.—Mr. Spiller, some time ago, made a careful examination of ebonite baths, and found that when pure, as manufactured by Silver and Co., they were perfectly innocuous. See his communication in the Photographic News, vol. vii. p. 383. Our own experience has confirmed this. We will write shortly.

One who has Paid for Experience.—An article on Front Light, Tunnels, &c., answering the questions in your letter, was written for last week, but was compelled to stand over, and must do so again. It will probably appear in our next.

W. Steele.—No. 342 is reprinting. You did not send any address.

Jas. Sugg.—All the numbers you mention are in print, and can be had from the publisher, on sending the amount in postage stamps.

C. T. Winter.—In our next.

Several Correspondents in our next.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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MINUTE YELLOW SPOTS ON ALBUMENIZED PRINTS.

For some years past we have received from time to time examples of a peculiar defect in albumenized prints, with inquiries as to the cause and cure. The spots have puzzled us, and we have not been able with any certainty to indicate their origin or to suggest a remedy. They consist in minute spots of a pale greenish-yellow, suggesting imperfect fixation. They have varied in size from a mere point to a disc the size of a pin's head. They are generally perfectly round, are sometimes alone, sometimes in clusters or groups; and when one is present, there are generally more on the same print. The minuteness and perfect roundness have forbid the notion of patches of imperfect fixation from the sticking together of the prints, &c.; and the only solution has been the probable presence of minute specks of foreign matter in the paper which produced the spots in question by its reaction on the hypo fixing bath. It has generally been observed that these spots have appeared whilst the prints were washing; sometimes they did not appear until the print was mounted, just as patches of imperfect fixation behave. These troublesome spots appeared, however, in the hands of the most careful printers, as well as in the hands of the most careless; some of the most eminent photographers of the day having been pestered with them, without being able in any way to account for their presence.

The common piece of injustice to which manufacturers of materials are inevitably subject of course occurred here. No possible cause in the manipulation or formulæ being apparent, the manufacturers of paper were naturally blamed, and this the more naturally, seeing that certain samples of paper were more prone to this defect than others. We are glad to say, however, that another solution of the problem has come under our notice, which perfectly accounts for the phenomenon, and which, we have no doubt whatever, is the real explanation. We cannot verify it with certainty, because we have not, in our own practice, met this trouble for many years. The explanation, however, seems to coincide with all the facts. The spots really are caused by imperfect fixation, and their peculiarly regular shape and minute size is readily accounted for. They are caused by the formation of small air-bubbles on the print when it is first immersed in the fixing bath. These bubbles, which adhere very tenaciously, and are not removed always by the mere agitation of the print in the bath, protect the point upon which they are formed from the perfect action of the fixing solution. Sufficient effect is produced to form the insoluble hyposulphite of silver, which is left in the print, and decomposes either in the washing water, or after the card is mounted and exposed to light and air, forming greenish-yellow, or brownish-yellow spots. The cause being discovered, the remedy will be tolerably apparent. Wherever a sample of paper is met with which has the tendency to form these bubbles on contact with the hyposulphite solution—and thick *Rive* samples will be found most prone to this peculiarity—the bubbles must be carefully looked after and removed, and the spots will be avoided. We are indebted for the solution of this difficulty to a correspondent, to whose letter, in another column, we invite the attention of our readers.

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FRONT LIGHT, TUNNELS, ETC.

Notwithstanding all that has been said and written on the subject, the construction of the glass-room and the best mode of lighting remain matters of anxious thought and earnest enquiry among all about to build new studios. Scarcely a week elapses that we do not receive one or more letters of enquiry as to the best mode of proceeding; but as, in most cases, the enquiry refers to special cases, governed by especial conditions, the advice fittingly appears in our "Answers to Correspondents." Occasionally, however, we are asked to give a general statement of principles upon which the glass-house should be built, and the mode in which the sitter should be lighted, and we have recently been called upon, once or twice, definitely to justify advice we have given, or defend opinions we have expressed, especially in relation to what is called the "tunnel." In some letters we shall quote, we are placed in both these positions, in reference to which a few words may be necessary. The first letter, from a photographer in the country, we shall print in full, notwithstanding that the writer is a little unreasonably annoyed because he has not been quite successful in getting good results in a studio which he considers was built under our advice, a responsibility which, in passing, we must decline to accept: we never recommended front light, and in regard to the adoption of the tunnel, we gave information rather than advice. His letter is as follows:—

"Sir,—Some two or three years ago you gave great prominence to a new form of photographic studio, publishing, about the same time, several designs on the same principle, the main light being obtained from a sloping front skylight, beyond which was a dark passage, or tunnel, in which the camera was to be placed. Partly influenced by the novelty and feasibility of the idea, partly misled, I suppose, by the ugliness and inconvenience of the structure, which seemed to suggest efficiency—as we often think ugly things *must* be useful—but principally by the praise given to it in your columns, I was induced, in an evil hour, to have such a studio constructed, sparing no cost or pains in making it as perfect as possible.

"The dimensions were as follows: total length, 25 feet, of which 11 feet were studio, and 14 feet tunnel; the studio division was 11 feet wide, and the tunnel part 8 feet wide. Of the studio portion, 5 feet overhead and 5 feet on each side were opaque; the remaining 6 feet of the roof consisted of skylight, 12 feet high at the ridge, and sloping down in front to the tunnel, which was 8 feet high. The remaining 6 feet at one side were glass from the roof to within 3 feet of the ground; on the other side was all opaque, for the double purpose of preventing observation and avoiding the sun, for it was necessary, from the position of my garden, to build the house with the studio to the west and the tunnel to the east; my only side light, therefore, faced the north. There was 1½ foot of glass in front at each side where the studio joined the tunnel, which, like the side light, extended to within 3 feet of the ground. The whole was well and strongly built; and an excellent dark-room was built at the end of the tunnel portion.

"I had just got the building completed at the beginning of the summer, two years ago, in time, as I thought, for a good summer's work. I had a little, somewhat inconvenient glass-house, of the oblong, ridge-roof form, at the top of my house, but too short for taking cards, except with a lens of short focus, which gave the feet out of focus, and the corners dark; and I had hoped with my new room and a new rapid card lens to do my work well and comfortably. But as soon as I got into my new glass-room all my troubles began. The tunnel had one advantage; it enabled me to focus easily without any cloth over the head; and, by contrast with the darkness of the tunnel, I suppose, the image appeared exceedingly brilliant and beautiful on the ground-glass, which put me in good spirits at the outset. But a woeful disappointment awaited me. I exposed a plate and developed; out flashed the forehead, end of the nose, and some other prominent points at once, in a way which did not please me. On examining the negative, I found it under-exposed, hard and flat, and further experience convinced me that the brilliancy of the image on the ground-glass was very deceiving, the darkness of the tunnel giving a factitious effect of great illumination to the figure in the lighted part of the studio. Further trials followed; and I found it difficult to get other than flat, hard faces, with black-looking eyes and nostrils; the front light and top light from the slanting skylight seemed to strike the features too abruptly and fiercely, burning out all detail in the prominent features, giving patches of densely opaque light, long before any detail was obtained in the shadows of the eyes, especially if the sitter had a heavy brow.

"Then came the question of blinds, and all the troublesome experiments to which I referred in a letter on the subject, asking your advice, about a year and a half ago. Finally, I found that by covering at least two-thirds of the skylight with blinds, leaving a strip of about four feet at one side adjoining the skylight, I got tolerably decent pictures, with good modelling, when the exposure was right. But I had to increase my exposure terribly, giving from twenty to thirty seconds often in summer light. However, during the summer, having a rapid lens, I got on pretty well; but when winter came, the bad light made it necessary to get rid of blinds, and with this came the old bad lighting, and this, together with the dull, gloomy, cheerless effect of the place, fairly drove me from it, and I worked during winter in my old studio at the top of the house, which had been originally built, I believe, for taking Daguerreotypes, and, by persuading my sitters to do without full-length standing figures, I got on pretty well.

"Last summer I worked in my tunnel studio again; and had a modification made which gave me more front light, but less top light; but I am so thoroughly out of love with it that I have resolved to rebuild it; and although I have got into the scrape through following the plans given by you, I do not hesitate to ask for a little further information. Please state, if you can, how Mr. Rejlander contrives to work in a studio of this kind; 2nd, if you endorse Mr. Robinson's recommendation to have the studio as like an ordinary drawing-room as possible (I can confirm his remarks on the depressing effect of the tunnel!); and, lastly, if a lean-to roof is as good as the ridge roof in a room which can only be lighted from one side?

"If I may add a remark without offence, I would suggest that as country photographers rely very much upon the journals for information, the construction of such a serious affair as a glass-house should not be recommended on fanciful theoretical plans, until such plans have been tested by experience.—Yours obediently, One who has paid for Experience."

Before adding one or two words of comment upon the above letter, we will make an extract from another, received a few days previously. The writer, "B. L. R.," says:—

"Mr. Robinson, in the recent paper he read at Edinburgh, in denouncing the exploded 'tunnel' fashion of glass-house, referred to Mr. Rejlander as using one. Can you explain how he gets the beautiful effects of lighting exhibited by his pictures with a top front light? I can understand Robinson's wonderfully modelled and artistic pictures being produced in glass-rooms such as he recommends; but I cannot understand Rejlander's being produced in the studio denounced. *Apropos* of the latter, was ever any real explanation made of the discrepant statements as to the expense and alterations made in Mr. Rejlander's room, mentioned in Mr. Robinson's paper, and denied subsequently in the *British Journal?* In the answer quoted as from Mr. Rejlander, that he had not altered it 'since the glass was put in,' there is something very suggestive of truth, but not the whole truth. You promised, some time ago, to describe Mr. Silvy's new studio. When may we hope for the description?"

We will reply to one or two questions in this letter, and then return to the general subject. Mr. Rejlander's principal light is a large side light, opposite a fine open expanse of sky. Our correspondent will find a diagram of his room in our Year-Book for 1864, from which he will see that he does not work with front light. The question of the tunnel is one of convenience, not of lighting, of which we shall say something by and by. It has, however, unfortunately, been too generally associated with front light. The question of the expense of alterations in Mr. Rejlander's glass-room is of too purely a personal character to be worth discussing. The simple fact is, however, that these alterations, undoubtedly made, were before the glass was put in, and were, so far as we remember, ordered by the district surveyor. The tunnel form offered a temptation to build chiefly of wood; and this, when done, was disallowed by the authority we have named, who insisted on corrugated iron. We shall describe Mr. Silvy's studio shortly.

To return to the general question as raised in our correspondent's letter first quoted. A top and front light, with the ridge crossing the room and the skylight sloping down in front of the sitter—the form which has been commonly used in the tunnel studio—may be made, under certain conditions, an excellent light; but is, under others, as the repeated experience of the last few years has proved, most inconvenient, unmanageable, and inefficient. A studio with such a light must, imperatively, be large, so as to permit the sitter to be placed under blinds in one portion of the room, whilst sufficient light is admitted from a portion of the sloping front skylight to give the effect of a high side light. Such a room is that of Mr. T. R. Williams, and his lighting of the sitter is generally perfect. If, however, the room be narrow, so that to get sufficient light, the whole or the greater part of the skylight requires to be uncovered, the results are hard and flat in the extreme; whilst if, to get modelling by altering the direction of the light, a portion of the skylight is covered, the loss of light becomes an insuperable difficulty. We have recently met with many instances of this. Mr. Samuel Fry, in a new studio he erected a year or two ago, found this form quite unmanageable from these causes. He has altered the studio to the ordinary ridge roof form, with the utmost advantage, retaining, however, the original dark portion at the end. Experience alone could prove this so thoroughly as it has done; but the result is quite in accordance with the principles of lighting upon which we have always insisted. The principal light should be a high side light a little in advance of the sitter; practically, a side light including a little top light and a little front light. If the face and figure were illuminated with a light coming directly from one side only, the image would be cut into two halves, one quite white, with scarcely any detail, from excess of light; the other half nearly black, with scarcely any detail, for want of reflected light in the shadows. If the face, &c., were illuminated with a light directly in front of them, the result would be great flatness; each side of the face would be illuminated alike; no light crossing the prominent features, there could be no approach to cast shadows, and a general absence of relief would be the result. With some subjects, in highly skilled hands, an exquisitely soft effect might be produced; but for the majority of purposes such a light would be practically useless. The top light, on the contrary, often gives much vigour and relief, but, for strongly-marked features especially, this vigour and relief often verges into harshness, and offensively black shadows are found under all prominent features. The high side light a little in advance of the sitter avoids all these faults; it gives relief and vigour without harshness, softness and delicacy without flatness or tameness. It is, moreover, the light by which persons are usually seen by their friends, sitting in a room illuminated by an ordinary window; they rarely sit with the face fronting directly opposite the window, and they equally rarely sit in rooms lighted by skylights.

The point to be gained, then, in the studio, is the kind of lighting we have indicated, no matter what the form of glass-room which circumstances may have rendered desirable or imperative. Such lighting may be gained in almost any form of glass-room, if it be large enough to exclude the light from one portion and admit it in sufficient quantity in another; but if the size of the room be restricted, it is indispensable that the arrangements for letting in or keeping out light, admitting of but little variation or modification as circumstances might demand, should be of the best character. This is best obtained, we have no hesitation in saying, after examination of very many studios, working in many, and examining the results of more, in the ordinary oblong room with ridge-roof, with sufficient glass in sides and roof in the middle portion, and sufficient portion opaque at each end—such a room, in fact, as we have before described in our Year-Book; such a room as that recently described by Mr. Robinson in his paper; such a room as that in which he himself, with scarcely the necessity for ever touching or rearranging a blind, takes some of the most perfect photographs ever exhibited, and with which many of our readers are familiar. Failing the facility for the ridge-roof and light in both sides, the ordinary oblong room with lean-to, or pent-house roof, will answer well, and is, indeed, preferred by some excellent photographers. For a description of such a room we need only refer the reader to an admirable description given by Mr. Hughes in our last Year-Book, a form in which he has proved his faith by recently building two large studios, the most complete and perfect in arrangement and appointment of any we know.

We had intended to make some further observations on front light and the conditions of its use, and also on the question of tunnels; but we find we have already exceeded the space at our disposal for the present article, and must defer the further consideration of the question until our next.

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INTENSIFYING BY MEANS OF MERCURY.

In a recent article on intensifying, we condemned generally, as we have often done before, the use of mercury as an intensifying agent. In doing so, we find from some correspondence that we are somewhat liable to be misunderstood; it may be desirable, therefore, to add a few further words of explanation. Before doing so, however, it may be well to place a letter before our readers, which we have received from Mr. Winter, of Barnstaple, from whom we published a communication in our last volume, describing a mode of intensifying with mercury and gold, which gave exceedingly fine results. Mr. Winter enclosed then, as he does now, some exceedingly fine prints, manifestly produced from delicate and brilliant negatives, as illustrative of the results obtained with the intensifier he described. It is evident from the prints that nothing need to be finer than the negatives from which they are produced; they are evidently delicate, round, and vigorous. The letter is as follows:—

Newliston House, Barnstaple, April 16, 1866.

Dear Sir,—As I see, by your leading article in the Photographic News of the 13th inst., that you are now experimenting with intensifiers, perhaps I may be permitted to ask you to try the gold and mercury intensifier, about which I wrote to you last September; and if, on trial, you think favourably of it, to report upon it in the Photographic News (see Photographic News, Sept. 15th, 1865). You appear to think that all intensifiers of which bichloride of mercury is a constituent, are *generally* to be condemned. Perhaps you would find that this modification is one of the exceptions to the general rule. There is, as with Selle's intensifier, no risk of stains, and the negatives do not alter nor deteriorate. The solution is poured over a *well-exposed*, fixed, and washed negative, and is as simple as possible in application. You spoke very highly of the cartes I sent you illustrative of the process, and for this I beg to thank you. I forward a few more, which I think you will consider not deficient in delicacy. I have not yet tried Selle's intensifier, and I am so well satisfied with my own that I am in no hurry to do so.

I very cordially agree with the photographer who "prefers the developer which permits the detail to be fully out, without conferring much intensity, so that, by a second process, he can secure just the amount of intensity he requires," &c. I also endorse very fully your remark that "to secure that the aggregation of deposit necessary to produce intensity shall be in the exact ratio of the development of detail demands a perfection of chemical condition, &c., which could rarely be hoped for," &c.

I ought to state that, with my intensifier, the *ordinary* iron developer, or the saccharated developer, should be used, but not the *gelatine* developer. Of the two solutions (viz., the gold solution one grain chloride gold to a drachm of water; and one ounce bichloride mercury, and one ounce hydrochlorate ammonia to twenty ounces water) four drachms—two drachms of each solution—should be added to four ounces of water; at least, this is the proportion I have found to work well (see Photographic News, September 15). With many apologies for thus troubling you, I remain, dear sir, yours obediently, C. T. Winter.

P.S.—I do not write this letter for publication, unless you should wish to make use of it in any way, and then it will be at your service. I need hardly add that I have no pecuniary interest in the gold and mercury intensifier. I should also refer to the advantage it possesses in enabling the photographer and the sitter to *judge almost as well* of the likeness and expression from *the negative* as from a *printed copy*. This is done by treating the negative *slightly* with the intensifier, which enables you to see the portrait *through* the glass like a very fine and delicately shaded positive.

We have not as yet had opdortunity of trying this intensifier, but shall do so shortly. Nevertheless, we can readily believe, from what we know of the nature of the salts employed, that exceedingly good results may be obtained. We have experimented largely with almost every form of mercury intensifier; with the bichloride of mercury alone; with the same, followed by ammonia, by hyposulphite of soda, by hydrosulphate of ammonia, and by an iodide; with solution of the double iodide of mercury and potassium; with iodide of mercury, followed by pyro and silver, &c., and with various modifications of all these. We have at times found them all useful, and all yield good results. A few days ago we were asked by a friend how to intensify certain negatives which, having been taken in an extremely dull light, with a lens of long focus and small aperture, and then developed with iron, obstinately refused to acquire any intensity on the application of pyro and silver. We recommended, after fixing, the application of a weak solution of bichloride of mercury, followed by a weak solution of iodide of potassium; this slightly increased the intensity, but still not sufficiently, the original deposit being so exceedingly thin. We now recommended the application of pyro and silver, which at once produced sufficient intensity, and a good printing negative was obtained from what at first seemed hopelessly thin and feeble. This is one illustration of the occasional value of mercury. The late Mr. Lacy, of Ryde, who used to produce some of the most perfect negatives we have seen, employed a solution of bichloride, followed by iodide of potassium, for intensifying, and was always eloquent in the praise of this process; and we can at any time produce excellent results by following his method. But notwithstanding all this, we generally condemn the use of mercury.

The reason is simply this: it is a dangerous and troublesome thing in inexperienced hands. It is so easy to get into difficulties, and at times requires so much skill and experience to remedy the evils produced, that we generally caution the inexperienced against its use. It is evident that Mr. Winter's formula answers well in his hands; it may be that it will do so in the hands of others, and give less trouble than other mercury processes; but is liable, theoretically at least, to one strong objection common to many of the mercury processes: it will probably be liable to change in printing. The application of bichloride of mercury to a silver image produces a complex effect: there is a deposit of the mercury salt, and there is a partial change of the silver into chloride of silver. Now this is of course liable to become blackened by light, thus rendering the negative more intense after printing for some time than at first. This was the primary fault in the process adopted by Mr. Lacy; and many of his finest negatives finally became so hard as to be almost useless. It may be that Mr. Winter does not find that, in practice, this takes place in his hands to any appreciable extent; that is a point which practice only can determine. We have again referred to the general question, and given our reasons for not recommending, for ordinary use, an agent which is attended with various risks, notwithstanding that it is a valuable adjunct in experienced hands. Nevertheless, we, on behalf of our readers, are indebted to Mr. Winter for the explanation and advocacy of a process which, in his hands, has yielded such good results. It is by the earnest and disinterested expression of individual experience that photography progresses with rapid strides to perfection.

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RETOUCHING NEGATIVES.

BY J. GRASSHOFF.

By the above is to be understood only a touching-up and improving of the plates, which is especially of advantage in the portrait department, especially if it aid in the removal of freckles and other yellow and brown spots which show themselves in the complexion, as disturbing and too dark. Following the instructions in a communication of Herr Hummel, photographer, I employed for this purpose the common soft lead pencil, and that in simple application to the varnished plate.*

For parts to be very strongly retouched (*e. g.*, in the case of enlarged copies of pictures, where the fibre or texture of the paper proves a disturbing cause), it is preferable to use a black "oil chalk" (creta polycolor). With this it is more easily drawn, especially in the dark parts under the eyes, &c., which are often taken too dark. In order to have a clearer and better view or insight into the work itself, it is best to work at a lamp which has an opal glass shade. A round piece of pasteboard, bent so as to suit, and in which a hole is cut of 1½ to 2 inches, is put over this as a dark shade. The plate is so directed that the light is always chiefly thrown upon the head, or the part to be wrought upon. If one works by day, however, lay the plate on a fine thin cut pane of glass; cover the varnished side with a piece of pasteboard, which has a sufficiently large piece cut out; hold the whole towards the window, and get the light cast only on the parts to be worked on. By this arrangement the eye is kept from over exertion, and protected from the dazzling light; and the attention is concentrated on those places which are just to be worked upon. One perceives then the defects to be covered more easily and quickly.

The lead pencil or the "oil chalk" adhere both fast enough to the layer of varnish. There is no danger at all of the one or the other coming off on the paper in the copying.

Spots and pin-holes are best closed with India ink.

A certain skilfulness, however, is always necessary for this easy method, especially in the fixing of the lights; but one can very soon and very easily make himself thoroughly acquainted with the work, since it is always easier to work with pencils than with brush and colours. It should be noticed that in places where there is pencilling, the oil chalk no longer adheres. In such places, therefore, where lead pencil has not sufficiently covered, India ink must be used to intensity.

We shall speak afterwards on the composition of a colour for the shutting out or lessening the effect of the sky and the like, which will meet most demands.

Photographische Mittheilungen.

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EXPERIMENTS WITH THE PANTOSCOPIC LENS.

BY DR. H. VOGEL.

Herr Busch kindly placed at our disposal a specimen of his pantoscope, and we made with it a series of experiments in order to establish its usefulness in different circumstances. The instrument handed over to us has a depth of focus 4½ inches, an angular aperture of 7⅔''', and a largest stop of 1⅓'''. We took a series of pictures with it. With the largest stop alone the object-glass gave pictures only imperfectly sharp; with the third and fourth, on the other hand, they were sharp to the very edge. The strength of light is, of course, only trifling; the focussing has, therefore, its difficulties, and requires a somewhat experienced eye. However, after some trials, it can easily be done. The fineness of the delineation is all that could be desired. The unusual angle extension was shown best from the circumstance that four plates were sufficient to take in the whole panorama of Berlin from the Polytechnic Institution. In order to compare the pantoscope with the old triple lenses, we took Dallmeyer's Triplet No. 1, which has almost the same depth of focus as Busch's Pantoscope No. 4. We took with the former a view of the Schlossplatz from the same point from which Herr Remelé had taken one with the Pantoscope No. 4. The picture produced by the latter had exactly double the length of that produced by the triplet of the same focus.

Further, the depth of focus of the instrument was remarkable. In the photographs taken from the roof of the Industrial Institution, the 10' remote objects appear quite as sharp as the horizon; the very stool, which served as the support of the camera, and had only twenty square inches surface, was, notwithstanding, visible on the picture with considerable sharpness.

The repeated focussing is not further required in the taking of the panorama. If one has once focussed, he can turn the camera till the second part of the panorama appears on the picture, and then immediately expose to the light.

The delineation was perfectly accurate. This, together with the large angle of view, is most strikingly seen in the print of the City Hall (Rathhaus) from the roof of the Court House (Stadtgericht), in which the unusually near massive pile of building appeared perfectly sharp from the ground to the highest point of the tower. The camera must here be exactly level.

At first sight, the perspectives appear in other respects on such a pantoscopic picture untrue or exaggerated, without, however, being so. The reason lies simply in this, that the near objects in the foreground, which appear very large on account of their nearness, are taken along with them. In comparison with these near large objects (which are wanting in old photographs on account of the small angle of view, and which appear large), those more remote appear unusually small, and hence the apparently exaggerated perspective.

There remain yet a few remarks to make in regard to the size of the picture. The pantoscope, of course, produces pictures of twice as great a surface as a triplet of equal depth of focus; but the size of the individual objects (*e. g.*, of the same house) is in both prints the same as if they were taken from the same point.

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* Rabending, in Vienna, proceeded in just the same way—as was communicated to us—who has no equal yet in touching up the negative.—Ed.

An important element in the use of the pantoscope is the strength of light, which diminishes towards the edges; and it is clear that in consequence of this the border will still be too little exposed, when the middle has been sufficiently exposed. Herr Remelé, therefore, allowed the edges to be longer exposed, while he covered the angle of view in the middle, and was successful. We have not employed this with smaller plates, but have avoided the defect by letting the developing solution work more on the borders of the plates than on the middle. In a sunny spot an exposure of one minute is sufficient, but in the shade we require from two to four minutes.

We directed special attention to the bright light spot in the middle, which so often appears in the use of globe lenses. In our first view, taken when the sun was behind the instrument, it did not appear. However, when we directed the instrument straight against the sun, it showed itself very distinctly in the middle of the ground-glass.

It disappeared, however, again when the sun was so far shut out that he shone no more on the stop; and in the copies taken now there does not appear the trace of a ring. On the other hand, it appeared in several following prints taken when the sun was in front of the instrument, partly hidden, however, by clouds. We thought that this cloudy shade would be sufficient, and leave the objective quite free; but we were, however, mistaken. Hence it is necessary, in all experiments "against the sun," to protect the instrument as much as possible from the light pouring in from above. A moveable wooden lid serves this purpose best. In several of our impressions the natural clouds are seen. They appear (in the positive) brighter than the blue sky in those which were taken against the sun; in the rest, darker.—*Photographische Mittheilungen.*

ABOUT SOME MAKESHIFT ACCESSORIES.

BY A PRACTICAL MAN.

I lately paid a visit to a photographer in a small way, in an out-of-the-way market town in the West, and was much struck with the following home-made accessories, that answered very well and cost but little in construction:—On one side of the glass-room—the light side—was a row of covered frames, generally called louvre-boards; with these he let in or shut out light at pleasure. I asked him if he was not using an idea that was patented. "Well," he said, "possibly so;" but he was rather inclined to think he had seen the same sort of thing in use long before the patentee was born. He then mentioned that fifty years back the elder Brunel had a horizontal saw-mill on the louvre-board principle near Battersea Church, on the opposite side of the river to Cremorne Gardens. The principle was also applied by two scene-painters, Tomkins and Pitt, some forty years back or more, to a scene at the Old Adelphi, in a piece called "Valmonde," where a deep-set cavern changed instantly, by simply turning the louvre-boards, to the interior of a magnificent palace. I then noticed a peculiar kind of background that he used, and called the "jack-towel" background. Now, jack-towels have, owing to the refinement of the age, gone out of fashion, and the towel is hung by a loop on the nail. The principal use of the jack-towel movement was, after rubbing the face or hands with one part of the cloth, to pull into use a clean and dry portion for the final wipe or polish. So with the background; by pulling the cloth up or down on the rollers, you could vary the gradnated back from light to dark, higher or lower, as might be wanted. All that is required is to have a top and bottom roller put into two upright pieces that have a foot to each (like a chamber towel-horse), as a support. The painted cloth—woollen cloth—or, in fact, any kind or number of backgrounds, may be put on the rollers and brought into use at pleasure. A piece of brown canvas was hung at each side, to be pulled into folds at pleasure, and mask the woodwork of the frame. The pedestal I saw in use was made from an American clock packing-case; the two sides and one end had coarse brown paper pasted on, panels formed and ornamented with thick pasteboard, and, finally, a coating of distemper colour to suit. Each face could be brought into use when needed; while a vase, books, a globe, clock, statuettes, &c., &c., could be placed on the top, according to taste and fancy. All these were highly effective in the proofs, as also made and arranged with little trouble or cost.

ANOTHER NEW DEVELOPER.

BY H. FITZGIBBON.*

Having read and tried most of the different new developers that have lately come to light, and not finding any of them equal to the following one, which I have used for some time in my gallery, I now send it to you for the benefit of the photographic fraternity. I claim for this developer the following (that is to say, as herein set forth! I don't intend to take out a patent):—Cheapness, the ease with which it is made, less time in the camera, no fogging, and an extra roundness to the picture when printed from the negative developed with it. It can be used immediately after being made, and it has the important improvement of preventing the collodion from cracking or peeling off. There is no necessity for dashing or wasting the developer by overflowing the plate with it, as most of operators do; for this developer flows as even and free as any collodion. One ounce is abundance for a 4 4 plate.

Formula.

Just as I use it. Put one quart of water in a half gallon or five pound bottle; dissolve in it (after being pulverized) six ounces of protosulphate of iron; shake well until dissolved (any kind of water will do, but distilled is always preferable for mixing of chemicals in the business); then add to it twelve ounces of good cider or wine vinegar; shake it well; then add again to it one ounce of sulphuric acid: shake again well. Then put in another bottle or vessel one quart of water; add to it the white of one egg, or one ounce of the white; shake it, beat it, or mix it well up with the water; then pour it into the already mixed solution; shake it all then well up; filter it, and it is ready for use.

Recapitulation.

Water	½	gallon
Vinegar	12	ounces
Sulphuric acid	1	ounce
Albumen	1	ounce.

The cost of half a gallon or five pound bottle of this developer will not be over 15 cents., when heretofore the alcohol alone that generally was put in the old developer to make it flow cost more than that amount; so I say, Good bye acetic acid and alcohol for developing purposes! I never produced as good negatives, in all respects, with the old developer as I now do with this present one; and I hope the time is not far distant when another new developer will be given to the world, by which the time of sitting will be all but instantaneous, so that we then can certainly catch expressions as well as pictures; for there is no doubt but what the latent image is made immediately when the plate is exposed to the rays of light through the camera. All we now want is, *the real developer.*

THE CONDITIONS OF DEVELOPMENT.

BY M. CAREY LEA.†

What are the essential conditions of development? With all the immense talent, time, thought, and experiment that have been devoted to photography, this question cannot yet be answered. It has frequently been argued and studied, and yet the most opposite views are entertained upon it by those have most considered it.

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* *Humphrey's Journal.*

† *Philadelphia Photographer.*

Schnauss, to whom we owe many valuable experiments in theoretic photography, showed that pure iodide of silver exposed to light could not be developed with pure gallic acid.

Hardwich, Monckhoven, and others extended this observation to bromide also, and hold distinctly that when a film containing these silver haloids is exposed to light, the invisible image cannot be developed by either protosulphate of iron or pyrogallic acid, unless nitrate of silver be present; that in the absence of nitrate of silver nothing appears. Vogel quotes these experiments, and his own led him to the same conclusion.*

Contrary views are not wanting. Mr. Wharton Simpson mentions a series of experiments made by him, in one of which a plate was not only washed with care, but was plunged for a quarter of an hour into a strong solution of sal-ammoniac, and yet which developed a thin but distinct image with pyrogallic acid, and without any nitrate of silver; also other experiments, with concurrent results, in which various preservatives were present, and in all of which images were obtained without nitrate of silver being present. These experiments were made with films consisting almost entirely of iodide, with, however, a small proportion of bromide.

Major Russell, in experimenting with bromide films, found that he obtained, without the presence of nitrate of silver, not only distinct images, but, with the careful employment of alkaline solutions, even sufficient density to form a good printing negative.

The investigations in which I have lately been engaged on the subject of development have naturally led me to include this point also in my examination; and as my results have been perfectly uniform and consistent among themselves, I have reached a decided opinion as to the facts of the case. The explanation of these facts is a different matter, and one in which I see great difficulties. As, however, my experiments in this direction were not made for the purpose of supporting any theory, or even guided by any bias, I shall give them as they are.

Experiment 1.

An iodo-bromized plate was sensitized in the ordinary way in a very faintly acid bath, was exposed for the time necessary for ordinary iron development, and was then washed for five minutes under rapid streams of water issuing from a rose, and creating a strong ripple over the plate. As I mentioned before, in reference to other preceding experiments, the river-water used contained soluble chlorides enough to render it quite milky when a soluble silver salt was added. Therefore, such washing was clearly sufficient to expel all traces of free soluble silver salt.

This plate was then submitted to the action of a solution of pyrogallic acid, perfectly plain, but very strong, and without restraining acid, either citric or acetic. *A faint but distinct picture was obtained.*

Experiment 2.

The foregoing experiment was repeated, with a longer washing; first, ten minutes, then again, on another plate, with forty-five. In both these cases, and even with this longest washing, a faint, very faint, but still perfectly distinct picture came out, with foliage perfectly distinguishable against the sky.

Experiment 3.

It was now determined to add to the foregoing a far more searching test than they could be held to constitute—one which the preceding investigations had revealed as constituting a crucial test in such cases.

A plate was exposed and developed in the ordinary way, and then the image removed, in the manner already described, with pernitrate of mercury. The plate was then well washed. *A strong solution of pyrogallic acid brought out a faint but perfectly distinct image.* A little alkali subsequently added (bicarbonate of potash was used) seemed to aid in bringing out the picture more distinctly, but the *image was rendered perfectly visible by the unaided effects of the pyrogallic acid.*

This developer was then washed off, and a developer of pyrogallic acid, acetic acid, and monobasic mercurous nitrate, prepared as described at large in a former paper, was applied. Under its influence the image strengthened rapidly, and all the details came out. (The object of this last portion of the experiment was to show that the mercurial development described in a previous paper was really a mercurial development, and distinct from the property of pyrogallic acid to develop a latent image without silver.)

If I had ever failed in any one instance to obtain an image with plain pyrogallic acid, after removing carefully the silver, I might feel some doubt as to my results; but as I have invariably seen this image appear, I cannot believe that the presence of free soluble silver salt is in any case necessary to development.

Such, then, are the facts. The explanation is another matter. *Why* pyrogallic acid has this extraordinary power of producing a faint visible image in the absence of silver in any form apparently reducible by it is most difficult to say; nor is the framing of any plausible hypothesis an easy matter.

A suggestion presented itself that seemed worthy of examination. Perhaps, after all, the invisible image was not a physical one, but possibly the silver haloid, although not decomposed or reduced (this was proved by its persistence through a treatment by pernitrate of mercury), had acquired a facility or predisposition for reduction, so that a reducing agent, without influence on unaltered iodide or bromide, was capable of attacking and reducing that which was so altered by light.

In order to test, as far as practicable, this question, it was resolved to examine the effect of simple reducing agents.

Experiment 4.

A plate was sensitized and exposed in the ordinary way, then washed as before, for five minutes, and a solution of *protochloride of tin* was poured over it. I need scarcely remind my readers that protochloride of tin, like protosulphate of iron, is one of the most powerful reducing agents known to the chemist. Yet it wholly failed to produce the faintest trace of an image.

This non-effect was in the present case especially interesting. In the experiments which I described in a former paper, protonitrate of mercury was shown to be capable of developing. Now it was not until after those experiments were made that I remarked that this substance was one of those pointed out by Dr. Vogel as capable of playing the part of a sensitizer towards those varieties of iodide of silver considered hitherto as insensitive. Although its function in developing was exceedingly different from that in which it was used by Dr. Vogel (in my experiment it was used as being capable of giving a precipitate of metallic mercury, in his as capable of taking up iodine; in mine as a developer after exposure, in his as a sensitizer before exposure), yet still it seemed desirable to draw as broad a line of distinction as possible between the two actions. And this is what is here done. Protochloride of tin, of all the substances tried by Dr. Vogel, acted most powerfully as a sensitizer; but as a developer it proves utterly powerless. Not only this, but the application of the chloride of tin proved to have destroyed the developable image; for, when the salt of tin was washed off, and pyro with protonitrate of mercury was applied, the plate instantly fogged all over; whereas, the other half of this plate, which had been cut into two after exposure and washing, when treated with pyrogallic acid and protonitrate of mercury, gave a clean picture.

Experiment 5.

Another reducing agent was now tried. It is well known that a highly basic metal, in dissolving in a dilute acid such as decomposes the water with liberation of hydrogen, exercises a very powerful reducing effect. It was resolved to apply this reducing force to an invisible image, which was done as follows:—

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* Dissertation über das Verhalten Chlorsilbers, &c. Berlin, 1863. Pp. 39.

Acetic acid was diluted with two or three times its bulk of water, and placed in a porcelain pan. The plate, sensitized, exposed, and washed, was placed in the acid, and lumps of granulated zinc laid along the edges. The dilute acid was used warm, and in a room at a summer temperature of full 80° F.* The experiment was made in the dark-room, and the vessel also well covered. Finding, after an hour, that no result had taken place, the plate was removed, and powdered zinc strewn over the bottom of the pan. The plate was then laid face down, so as to be resting on the zinc powder, and immersed in the dilute acid. At the end of five hours no trace of development had taken place.

I think these two experiments sufficiently show that development is not merely the bringing out of an increased capacity for reduction; and they make it most probable, if they do not absolutely prove, that the effect of light in the camera cannot be taken as giving rise to a simple *predisposition to reduction*; otherwise, that predisposition would scarcely fail to be brought out by the powerful means applied to that end.

Circumstances have brought my experiments to an end for a time, and I here take leave of these interesting examinations for the present. There yet remains much to be done in the study of this the central and most difficult point in photography, and not only will its complete elucidation be of the utmost importance, whenever effected, to photography, but also, in my opinion, to chemistry and physical science.

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THE ECTOGRAPH.

A correspondent of *Humphrey's Journal* gives details of producing the "Ectograph," from which we make some extracts:—

"In the year 1860, I took out a patent right for a style of picture which was named the Ectograph (the word *ectos* literally meaning built up from behind). The picture has met with the approval of all who have seen it, without exception.

"When it was first introduced, I found that photographers were unwilling to believe that a picture which looked so beautiful could be made so easily as represented. The fact being that few photographers had given their attention to positive printing on glass, they were not aware of the beauties of that class of picture, nor its simplicity. There was another drawback. The rage for cartes de visite was generally gaining ground; the Ectograph, however beautiful, unable to stand before the storm, bowed before the mighty one, and retired. The storm has gathered; an avalanche of cartes has been scattered over the land, the people are sated, and the photographers are tired; a 'new pleasure is demanded,' and the 'porcelain' appears, perhaps, the most beautiful of all productions of the photographic art, when well made and coloured; but in this lies the whole trouble,—it is not so very easy to make, and still more difficult to colour. A porcelain picture, when not well made, with all its black, harsh shades, to say the least, looks ugly; but when badly coloured, it is abominably vulgar. This is not said to depreciate the picture. I have already said, and I do believe, there is nothing so beautiful as a well made, handsomely coloured, porcelain picture; the difficulty lies in colouring it beautifully; and here is the chief excellence of the Ectograph—it is easily coloured, and it is quite as easily made as the porcelain picture.

"The following will guide the photographer to the easiest way of producing this picture:—

"The negative required is similar to those made for the solar camera, full of half-tone, not intense, clear and well defined. All imperfections in the negative will, of course, be reproduced in the positive; therefore, it is necessary to pay the greatest attention to this. Having obtained the negative, the next operation is to copy it. Place the negative in front of a copying box, and focus as usual, having previously, however, so adjusted the negative when in the box that the clear light from the sky will shine through it. If this cannot be had conveniently, then place the camera horizontally, and reflect the light from the sky from a piece of white paper, placed diagonally to the negative. A slab of plaster of Paris, made and used as recommended in Towler's celebrated work on 'The Porcelain Picture,' is, perhaps, the best for such work; but where the sky can be had, it is preferable. The camera must be elevated, as any objects, such as houses, high grounds, or hills, will obstruct the light, even if several miles off. Having now placed everything in readiness, proceed to copy the negative. A very short time is necessary, depending, of course, on the sensitiveness of the plate and the size of the diaphragm. With respect to the chemicals, nothing need be said; the formulas for the porcelain picture will answer for this.

"The glass positive having now been obtained, toned, and dried, lay it gently on a piece of white paper; if it looks well, the half-tones all clear, and the shades transparent, it will answer. Proceed to the next operation. Have ready a dipping bath of any kind. Place in it some of the very best sun-bleached wax. Now place the bath in a pan with water; let the water boil, and the wax will soon melt; into this melted wax dip the positive plate, as you would dip a collodion plate in the silver bath; let it remain in the bath till it is quite warm: now remove it from the bath, and allow it to cool; when cold, again dip it, with a gentle motion, down and immediately up again; a thick coat of wax will now be on the plate; remove the plate, standing it edgewise on a clean sheet of paper, and, with a flat long knife, remove the wax from the edges and back; if neatly done, the wax will come off clean; when the wax gets cold, however, it is troublesome to remove, so care must be taken to remove it when warm. Now clear the wax off the glass with alcohol or benzine; lay the picture on white paper, and it will be very beautiful. In this state it will have the appearance of a porcelain picture, and, to my fancy, it has a much finer effect, owing to depth and roundness. Copies of statuettes in this state are magnificent. On looking at the picture through a magnifying glass or stereoscopic box, it is wonderfully beautiful; the very life appears.

"The colouring, if required, is easily done; it is only necessary to follow the lines and shades of the photograph; taste will dictate where and what colour to use. Water colour will require a little oxgall or soap to be rubbed over the wax before being applied; powder colours or oil colours will go on without preparation.

"In practice, however, I have found it better to varnish the wax previous to colouring. Pour a very small quantity of spirit varnish on the centre of the wax, then, with a soft rag, gently rub it all over the wax; it will immediately dry. Now, in colouring, should it be required to remove the colour, as not being suitable or put on badly, wipe it off with a damp rag, and commence again.

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THE PRIVILEGES OF THE WIFE OF THE AMATEUR PHOTOGRAPHER.

Mr. Editor: As you have been presented with articles describing the trials of the amateur photographer and his wife, it seems but fair that the reverse of one part of the picture should be exhibited, and the world made aware of the *privileges* which belong to the lady whose happy lot it is to have a husband addicted to this beautiful art. These are many and manifest. I will try to name a few of those least obvious to ordinary eyes.

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* As temperature has an important influence on all photographical phenomena, it is as well to state that all the experiments described in this and the previous paper were made at or about this temperature of 80° F.

* *Philadelphia Photographer.*

In the first place, the mind of the lady so happily circumstanced has peculiar faculties afforded it for expansion in scientific knowledge by the permission given her to watch the progress of this wonderful process of sun-painting. She has a peep now and then into a dark closet, very close and smelly, where a dim gaslight trembles over a bath in which prints are washed after due chemical treatments, and, if quiet, capable of entire abstinence from a natural propensity to finger, she is allowed to look at the dripping negatives, held up before the glimmering gas-jet, and to exercise all her feminine sagacity in guessing that a beautiful negative has been secured! If very careful, she will also be allowed to carry the plates to their appointed resting places, and see them drain and dry. All proper questions as to "why and wherefore, when and how," will be answered briefly at intervals, and may indeed be asked occasionally or continuously with the satisfactory response, "My dear, don't trouble me now;" "I will tell you by and bye;" or, "You can't understand the process; it is the result of chemical affinity. The actinic force affects the molecular arrangement of atoms so as to predispose them to the formation of new compounds with the re-agents subsequently applied." This, of course, is entirely satisfactory, and very improving. Thus, participating in the glory of perfecting *negatives*, and producing *prints*, she may complacently count herself a "votary of science," and triumphantly deny the assertion, "that women's rights," at least in the department of photographic science, are not duly respected and secured.

When the prints are toned, it is her high privilege to watch the bath in which they are washed, and for four hours she can run up-stairs, every few minutes, and see that the water has not overflowed, and that the prints are duly turned, meditating upon the process of purification, and enjoying the luxury of thinking that her husband, after the fatigues of printing, is amusing himself about the city, visiting friends, and holding pleasant converse with congenial spirits. Things may need attention in the nursery or store-room, in the parlour or in the pantry; but what are these matters compared with the advance of science? and how delightful the thought that she is sacrificing all things to the progress of art! Betty wants to know about the baking of bread or cakes, and Sarah would like the mistress to see about that dress which is to be altered; and that "lady," who was to come as laundress, is down-stairs, and wants to see the other lady for whom she is to work, and she can't wait, and the second lady has to run down and talk to her, with a mind distracted and disturbed about the up-stair 'lustrations. She mingles strange sentences about "baths," and "negatives," and "plates," and "tonings," with her general directions about duties demanded by said laundress and "privileges" to which said laundress makes special reference, and desires particular information; but what a privilege it is to undergo all this worry in the cause of science, and feel that, whatever may go amiss below, the prints up-stairs are being duly soaked and sufficiently cleansed from all chemical residnums! To think that through her agency and instrumentality "the actinic force" has had fair play, and the "molecular atoms" have had a chance of arranging themselves comfortably, in view of any and all future contingencies! Happy handmaid of science! Well may she rejoice, and count as small all nursery cares or kitchen exigencies.

In out-door work, too, her advantages are manifest and manifold. She is allowed (with many cautions and oft-repeated hints of carefulness) to carry in her lap the "camera!" Each jolt of the wagon is a season of gentle excitement and tender exhortation, and the "black baby," as one lady has christened the dark-japanned lantern) is really to her all and more than a living and white baby could be; and she realizes the delights of a tender mother in carefully nursing her little one, without any danger of hearing it cry, or dreading lest it should refuse to sleep, or wake up hungry.

When on the ground selected for operating, she is privileged to carry all the water from the spring or brook down in the adjacent hollow, which exercise develops admirably her physical forces, and may kneel down in the soft grass and wash "plates," while her husband is prospecting and choosing the best points of view for his proposed pictures. If she is tired, she has the perfect liberty of saying so, and will be charmed by the assurance that only a few more negatives will be needed, and that a pail or so of water from the brook down in the hollow will be all she will be required to carry. Fresh air, fine healthy exercise, patience exercised, perseverance exhibited, fatigue despised, hunger ignored, heat scorned, and virtue rewarded with the commendation that she has done tolerably well, and has not made very many mistakes!—all these are her special advantages, and we hope that she appreciates them!

Then, if she desires a portrait of herself or friend, she can secure it (when the artist has nothing else to do) without cost, save of coaxing and gentle persistence in demanding. All the poor prints of groups or landscapes (which nobody else wants) are munificently allotted to her, and gladden her heart and enrich her album. She is always certain to be attended to in her wants when everybody else has been served, unless all the prints are disposed of previously, and is delightfully conscious of the fact that the old and admired maxim of "first come first served," is an old humbug, for she has been first all day, having been present from the beginning, but yet finds the *serving* comes last to her, if it come at all; and thus she finds her position, as wife of an amateur photographer, assisting her in penetrating the profoundest depth of metaphysics and moral philosophy, and enabling her to dispose of many of the adopted axioms of worldly wisdom, and place them on the shelf as "old wives' fables."

If she loves distinction, and desires to be handed down to posterity, her wishes are capable of certain gratification. The wives of Rubens and Raphael and other painters live in the canvas of these world-renowned artists. Their wives were their "studies," and we see them constantly under the forms of Madonnas or goddesses, or other celebrities. The wife of Rubens is known wherever Rubens is known, and the Fornarina is as far-famed as Raphael, who painted her portraits. Now the wife of the amateur photographer enjoys the same privilege. She is his "figure" in all landscapes and in all groups, and lives in his "plates," as the persons beforenamed in the painters' pictures. Only fancy, then, the privilege enjoyed by the wife of the amateur photographer, when, laying her finger on some little white or black speck in a print, she is enabled to say triumphantly, "*That's me!*"

With such manifold privileges, mental, moral, and physical, we feel sure that the wife of the amateur photographer will withdraw her list of grievances, and allow the world to regard her lot as eminently favoured. Failing to do this, she will drive us to hunt up additional advantages which appertain to her position, and to compel silence by cumulative contradicting evidence.

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ARTIFICIAL LIGHT FOR PHOTOGRAPHY.

BY M. CAREY LEA.*

In the constant trials that are made of new sources of light for photographic uses, enough attention seems scarcely to have been paid to the nature of the light, as well as to its brilliancy. No fact is more familiar than that all highly actinic artificial light is either blue or bluish; and it seems certain that if any given light were to be tinged with blue, its actinic power would be thereby materially increased.

A striking illustration of the chemical effect of blue light is to be found in a variation of the old experiment of the action of light in causing the combination of hydrogen and chlorine, devised by Professor Hoffmann. This distinguished chemist substitutes, for sunlight, the blue light produced by the combustion of a mixture of vapour of bisulphide of carbon and nitric oxide gas.

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* *Philadelphia Photographer.*

The light of burning magnesium acts more powerfully than the lime light, which is far more intense. Evidently this is owing to its blue tinge. It would, therefore, be a very interesting experiment to tinge the lime light blue, and observe whether its actinic power would not be greatly heightened thereby. This effect should not be produced by interposing blue glass, which cannot increase the blue rays, but would probably be produced by soaking the lime cylinder in a strong solution of copper salt—probably a saturated solution of chloride of copper would be the most effectual. The experiment could be easily tried by those who are in the habit of using the lime light, and might give exceedingly interesting results.

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Correspondence.

FOREIGN SCIENCE.

[from our special correspondent.]

Paris, April 25th, 1866.

At the last meeting of the Marseilles Photographic Society, M. A de Constant proposed a method he has experimented upon, the chief and very important merit of which consists in effecting great economy of silver. His process is based partly on the principle indicated by Dr. Schnauss, that to obtain good positive proofs it is sufficient that the silver be in excess of the salt in the preparation of the sensitive paper, and partly on an analytical research by M. Pollock, in which it is shown that the white of egg contains sufficient salt in itself to effect the sensitive combination with silver. M. de Constant's formula is—

Pure nitrate of potassa	1 ounce
Pure nitrate of magnesia	1 „
Nitrate of silver	150 grains
Water	20 ounces,

forming a bath of scarcely 2 per cent. of silver. The paper employed is *unsalted* albumen; that sold by M. Marion, called *inerte coagulée*, is recommended as excellent in quality. In support of his communication, M. de Constant sent several proofs, mostly obtained with M. Meynier's ammoniacal salt of silver, employed in the proportion of 8 per cent.

It was remarked by a member, that there was reason to fear that the economy was only apparent, and not real, and that the bath would very quickly become exhausted, although the quantity of chloride of silver formed would be less. It was also a question whether some inconvenience might not arise from the introduction of the deliquescent salt of magnesia into the sensitizing bath.

Mr. Taylor presented to the Society a splendid collection of proofs obtained on Whatman's rough paper from negatives on turpentine waxed paper, the artistic effect of which excited the unbounded admiration of the Society. Mr. Taylor gave some explanations upon his method of operating, and the means he employed with the view of correcting the perspective direction of certain lines by a simple displacement of the objective upon the interior slide of the camera.

M. Vidal presented several proofs obtained upon paper prepared with nitrate of uranium, remarking that the processes based upon the special properties of nitrate of uranium are too much neglected. He believed in the greater stability of the blue proofs obtained with pure chloride of gold, and recommended observations to be made on this stability, of which he had already many proofs.

Among the proofs presented by M. Vidal, was one of a fine velvety black, obtained upon uranium paper by means of a bath of bichloride of mercury with silver development. In many cases this process permits the obtaining of powerful effects, while economizing chloride of gold.

During the summer season, solutions of pyrogallic acid rapidly deteriorate. It is true that a solution containing citric acid keeps a much longer time than one containing acetic acid alone, but the photographic action of the two acids is entirely different, and it sometimes happens that we wish to make use of acetic acid alone; then the addition of a minute quantity of citric acid suffices to make the whole solution keep much longer, while retaining the photographic reactions of acetic acid alone. M. Ommeganck proposes the following formula:—

Water	10 ounces
Pyrogallic acid	15 grains
Acetic acid	4 drachms
Citric acid	½ grain.

Mr. Civiale has made the following communication on collodioned waxed paper. He says:—"I have made some experiments in applying collodion on waxed paper, and although the experiments are not yet completed, I have obtained a first result which may present some interest. I have proved the complete adherence of the collodion to iodized waxed paper, size 16 inches by 12. The paper, waxed by means of a mixture of 4 parts of paraffine and 1 part pure wax, has been immersed for two hours in a bath of iodized alcohol, containing 3½ per cent. of iodide. When perfectly dry, the paper is ironed, then spread upon a glass plate, and fastened at the four corners and at the bottom with gelatine. Before the gelatine becomes dry, a large soft brush is passed over the sheet of paper, and, with a small brush filled with gelatine, a narrow border is formed all round the paper so as to increase the adherence of the collodion on the edges. The collodion is then poured on, as on to a glass plate; when it is set, the paper is removed from the glass and dried, flat or suspended. The collodion must be of medium consistency; three different collodions have given analogous results.

The collodion adheres well to the waxed paper, for the collodioned sheet has been put into the sensitizing bath, of 8 per cent. strength, washed in four waters, dried, exposed in the camera; the picture developed in a bath of gallic acid of ½ per cent., with the addition of a little nitrate of silver; the sheet of paper was then washed again, fixed with hyposulphite of soda at 25 per cent., washed in five or six waters, dried, and waxed. In these several operations, which have lasted more than twelve hours, the collodion did not become detached from the paper in any part. This is the limit of the result obtained, susceptible of application; but I must say, that I have found this collodioned paper much less sensitive than waxed paraffine paper.

Who has not many times found himself overtaken by the difficulty of strengthening a negative obtained with a small diaphragm in cloudy weather? There are a host of means, but few of any value—mostly sulphurations—and the conversion of silver into an iodide produces a pastiness; others are very delicate, and cause a great loss of time. M. Ommeganck proceeds in the following manner:—After developing, strengthen at two operations with a solution of pyrogallic acid, 3 grains to a pint of water, with 5 grains of citric acid, and 1 drachm of alcohol, to which a few drops of a 5 per cent. solution of nitrate of silver are added; then wash the plate without giving much concern as to whether the picture has gained much in tone. Then pour at once over the whole surface to be strengthened the necessary quantity of the following solution:—Water saturated with corrosive sublimate, to which is added, drop by drop, a solution of iodide of potassium or any other soluble iodide, until the red precipitate of iodide of mercury formed leaves a slightly red hue which does not disappear upon agitation; then add four times the bulk of water, and leave it to settle, or filter it and keep it for use.

At the time of operating, pour a few drachms into a glass, and add a few drops of a solution of chloride of gold at 5 per cent. Four drops to a drachm of mercurial solution will suffice. The pyrogallate of silver incrusted in the film of collodion reduces the salt of gold with great energy, and gives a sharpness and vigour which we have never been able to obtain by any other means. The salt of gold in the mercurial solution gives comparatively a mediocre result.

PHOTOGRAPHY IN GERMANY.

Sir,—The talk of the day in the photographical world turns here on the pantoscope lens and the "Magic Photography;" and the latter excites not only photographers, but also the public.

On Friday, 16th March, Herr Grüne showed this charming toy before the Photographical Society. He took a row of white albumenized sheets of paper, on which no trace of a picture was to be seen; covered them with blotting-paper, and sprinkled water on it. There appeared then on all the albumenized sheets perfectly detailed photographs with a brown tint. According to his account, the albumenized papers are fixed silver pictures, which are bathed in chloride of mercury till the disappearance of the picture, and then washed sufficiently. The blotting-paper contains hyposulphite of soda; this reacts on the chlorides—remaining on the paper, under the formation of a brownish black sulphide. A few suspected at first its importance as an article of commerce. The brother of the discoverer was the first who thought of bringing the matter before the public. The sensation was amazing.

Within a short time magic photographs were developed in all drawing-rooms. Even five days after the sitting, Herr Grüne had orders from all provinces of Germany. Three large studios copy at present for him, and he is scarcely able to do justice to all commissions, although quite a number of competitors have sprung up.

The number of the prepared magic photographs printed in Berlin amounts daily at present to 200,000. The *magic* consists not properly in the pictures, so much as in the new impulse which the photographical world, which at present complains very much of want of work, has received.

There is so very much to do in the way of magic photography that all other work is left in the background.

The principle, as we have seen, is not new. It was known fifteen years ago* that chloride of mercury whitens the silver print, and this white picture is developed with hyposulphite solution.

What is new in Grüne's discovery is, that he introduced into trade, not a fluid as the development, but a solid, as a piece of blotting-paper.

In this way he made the experiment for the first time fit for the drawing-room, and, through the application merely of water, all the more surprising.

Had he attempted to bring the development as fluid into trade, he would not have sold a single picture.

With the pantoscope lens, my friend Remelé and I have made a series of experiments, and we are very much satisfied with its results. I send you herewith a special paper on my experiences with this new lens, and will send you in the next some prints taken with it.

M. Remelé said of this lens in the Photographic Society:—"As a matter of course, by the unusual extension of the angle of view, the actinic power diminishes towards the edge, and the latter may therefore appear too little exposed, although the middle is already sufficiently exposed." This defect he avoided by exposing the border longer than the middle, and this he did by holding, after a certain time, a round black piece of pasteboard, about two inches in diameter, on a wire before the lens, and thereby covering the middle of the angle of view. One should hold the piece of pasteboard about half the depth of focus from the lens. The time of exposure in sunlight was one minute, and he did not notice the troublesome white spot which so often shows itself in the case of globe lenses. He employed the third largest stop, and got sufficient sharpness to the very edge. He believes that in this respect the pantoscope can accomplish everything possible for architecture and landscape, but for reproductions, on the other hand, the triple objectives are to be preferred. Dr. H. Vogel.

Berlin, April 20, 1866.

THE NEW INTENSIFIER.

Sir,—I beg to suggest nitrate of uranium instead of the sulphate; the latter, I imagine, may not be so easily procured (*i. e.*, here, at any rate). I have used it with success. My plan is as follows:—

No. 1.—Ferridcyanide of potassium ...	¼ ounce
Water	12 ounces
No. 2.—Nitrate of uranium (avoirdupois weight)	¼ ounce
Water	12 ounces.

Dissolve separately, and mix two ounces of each in a smaller bottle when required for use. I only use it for copying, not having occasion to intensify the ordinary "carte" negatives very frequently, and I must say, for that purpose, it is excellent. Thorough washing is necessary, especially if the negative is fixed with "hypo;" and it should be remembered that as ferridcyanide of potassium is one of the tests for iron, no trace of the developer should remain.—I am, sir, yours respectfully, David Duncan.

Brighton, April 19*th*, 1866.

[We have tested this modification, and find the result is satisfactory, although slightly different from that produced by the formula we before published. The operation of the solution with the nitrate of uranium is somewhat slower, and the colour more inclined to red.—Ed.]

SPOTS ON ALBUMENIZED PRINTS.

Sir,—During the past winter I have been annoyed with having pale yellow or lavender coloured spots on some of my prints. They do not show themselves until after fixing and being left in water for three or four hours.

I could not arrive at any satisfactory conclusion as to their cause, and sent you some prints so affected, so that I might have your opinion. In reply, you said you thought it was caused by some imperfection in the paper, &c.

Some week ago, when fixing a batch of prints, and after being for three or four minutes in the hypo, I observed a great number of minute air-bells formed on their surface, the largest not greater than a pin head. They adhere very tenaciously, thus retarding or stopping altogether the action of the solution. They do not leave the proofs until lifted out of the hypo, and, when replaced, form again as before.

I have tried a good many experiments to get rid of them—such as putting the proofs in warm water before fixing, warming the hypo itself—but all have failed to keep them from forming.

I then tried the following move (which, although simple in itself, answers very well), viz.. when all the prints have been put into the fixing, about fifty are taken out, laid one upon the other, pressed firmly between the fore-finger and thumb until the hypo ceases to drop; they are then returned one by one, after which no air-bells will form.

Since I have used the above means I have not seen any of the spots referred to on any of my prints.

Judging from recent answers in the News, I do not think I have been the only person troubled in this manner. If, therefore, you think the above will be of any value to your correspondents, its insertion will oblige yours, &c.,

P. S. I enclose sample of spots. J. A.

Wick April 21, 1866

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* At first published by Herschell, I believe.

Photographic Notes and Queries.

Suggestion to Portraitists.

Sir,—Will you allow me, through the medium of the Photographic News, to suggest the introduction of a new kind of album, for portraits either 4½ or 5 by 4, and for larger portraits, not full length, with the borders of the album printed for putting in name, birth, marriage, death, or any particular event of life; it might be called "The Family Photographic Register." I throw it out as a hint, because I believe it would receive acceptance with the public.—Yours truly, J. Stokes.

Mr. Hart's Economic Filter.

Sir,—On reading your description of Hart's Filter, it has occurred to me that a very useful addition might be made to it in the shape of a ground glass cover to the negative bath, having two holes drilled in it for insertion of the glass tubes used in the filter; as by this plan the solution might be filtered directly out of the bath into a jug, from whence it might be easily poured back. This would prevent the necessity for pouring the contents of the bath into the filter, which could scarcely be effected without spilling some portion.

I would venture to point out what appears to me to be an error in the wood-cut, viz., that both tubes are connected with the receiver R.—I am, sir, yours most respectfully,

Baynham Jones.

Cheltenham, April 24th, 1866.

[We print this suggestion, that any of our readers may make such an addition if they think proper, or that Mr. Hart may apply it.—Ed.]

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Talk in the Studio.

The Photo-Relief Printing Process.—On Tuesday last the Solicitor-General heard counsel on behalf of Mr. Woodbury and Mr. Swan, in relation to application from the former to be permitted to enter a disclaimer of certain sentences contained in the specification of his patent. Mr. Aston appeared for Mr. Woodbury. Mr. Grove, on behalf of Mr. Swan, opposed the application, on the ground that the object of the disclaimer was to improve an imperfect patent in relation to an invention in which he (Mr. Swan) was vitally interested. After hearing both sides, the further consideration was postponed, to enable Mr. Aston to produce further evidence.

"Magic Photographs."—The familiar experiments of the laboratory have in the present day a great tendency to become the magic of the drawing-room. Magic photographs are amongst the most recent of the scientific toys which take the public attention. These are of various kinds. The first and most common mode of producing them consists in placing an apparently common piece of blotting-paper upon an apparently plain piece of white albumenized paper, moistening the two and producing at once a photographic picture. The explanation of this is simple, and is doubtless familiar to old photographic experimentalists; we practised the same feat a dozen years ago. It consists in bleaching, until it is white and invisible, by means of bichloride of mercury, a silver print; then taking a piece of blotting paper which has been previously immersed in a solution of hyposulphite of soda, and placing it in contact with the immersed print; this, when moistened, at once darkens the bleached image, and a picture, consisting chiefly of sulphide of mercury, is produced. We have received some examples from Mr. Swan, and details will be found in Dr. Vogel's German letter in this number. We have just received from Mr. Hughes's establishment a still prettier application of parlour magic, in which, by placing an apparently blank piece of paper into a solution—the material for which is enclosed in the packet—a beautiful blue print is produced. This is doubtless the result of one of the applications of the Cyanotype process of Sir J. Herschell, which may be made to produce many beautiful transformations.

Poisoned by Photographs.—The following paragraph is going the round of the press:—"Two children in Chigago have been poisoned by putting a card photograph in their mouths. One has died, the other is very ill." It is tolerably clear that the poisoning, in such a case, could not proceed from the photograph. Possibly, the pigment of a glazed card might, in some cases, prove injurious, if sucked by a young child; as might also paste, to which corrosive sublimate had been added to preserve it, such addition being occasionally made by bookbinders.

National Portrait Exhibition.—The *Athenæum* says:—"It is intended to photograph the whole of the portraits now at the National Portrait Exhibition; the best examples are to be coloured. We may suggest how desirable it would be that the most interesting of these pictures, especially such as are unique, should be copied for the National Portrait Gallery. We understand that it is the intention of the Art Department, when permission, by the owners of the pictures, is not refused, to secure, by photography or other means, transcripts of the immense number of valuable details of costume, manners, and accessories, which are presented by the collection."

Disderi's Tone.—The prints made by M. Disderi are known to have a peculiar tone, gray in the half lights, and brown in the deep shadows, so disposed as to produce a very pleasing effect. This toning has excited much interest and curiosity, and some time since, when Disderi published a manual of photography, it was supposed that the toning process which he would recommend would be that which he himself used. This was found not to be the case; the formula and directions which he gave would not produce the effect which was characteristic of his own work. It was said at the time that he did not wash before toning, but used two toning baths in succession, the first bath being intended principally to remove the free nitrate, and prepare for the action of the second. A correspondent of the German *Archiv* now asserts that he obtains this Disderi tone by only half-toning his pictures in a neutral bath, and gives the following directions:—Dissolve 1 part of chloride of gold and potassium in 1,000 of water, and shake up with 5 to 10 parts of chalk. This bath is fit for use in a couple of hours, and keeps for months. It is, however, very doubtful if this light toning makes as permanent a picture as the deep colours. The stability of a picture may be rated in proportion to its gold, and the blue black pictures, though less pleasing than some others, are probably more lasting.—*Philadelphia Photographer.*

The Exhibition of Church Furniture, Pictures, Photographs, &c., &c., held at Plymouth, was, we are informed, a most interesting and successful affair. It would take more room than can be spared in these pages to notice a fraction of the wonderful specimens illustrative of and connected with ecclesiastical art; we shall only draw attention to the superb collection of rubbings, and think the photo-relievo process of Mr. Woodbury, or Swan's mezzotint process, might successfully and profitably be employed in their reproduction, for distribution and sale among the members of the various antiquarian and literary societies.

Curious Experiment.—At a recent meeting of the Manchester Literary and Philosophical Society, Mr. Brothers, F.R.A.S., stated, that when a solution of nitrate of silver, which, from long use, has become contaminated with organic matter from collodion plates, is neutralized, or made alkaline with carbonate of soda, exposed to strong daylight in an evaporating dish, and heat applied, a scum is quickly formed on its surface. This scum, when broken by a puff of air, exhibits, in a remarkable manner, all the appearances of solar spots as seen in good telescopes. So long as the current of air is continued, the scum remains open at the spot, but immediately closes *partially* on the cessation of the cause, and streams of the film stretch across the opening, illustrating the *bridges* over the sun spots. At the same time, a secondary scum commences to form at the edges of the opening, and may be called the *penumbra*, and in time closes the opening. The centre is occupied by the *umbra* formed by the carbonate of silver (white when first formed), which has, in the course of the experiments, turned *black*. It was found that when a current of the solution was forced upwards, these effects could not be produced, and the film was not affected when a small body was dropped into it. When the solution has been exposed to the heat for a few hours, the film becomes too thick to exhibit the experiment; and when cold, the appearances described could not be produced. This experiment was referred to merely as illustrating the *appearances* of sun spots, and in no way as explaining their cause. At the same time it suggested the idea that if the luminous photosphere of the sun is formed of bodies, named by various observers, "willow leaves" (Nasmyth), "rice grains" (Stone), "bits of straw" (Dawes), and of the existence of distinct bodies of some kind on the visible surface of the sun there can now be very little doubt, they may be floating in a fluid sufficiently dense to sustain them, but at the same time easily thrust aside by some disturbing cause below the surface. The existence of an external cause at the surface of the sun being improbable, may not the cause of the sun spots arise from a current or force, such as the "*red flames*," which are supposed to be connected with the formation of spots? This force, acting on the "willow leaves," would raise them from the level at which they may be supposed to float; they would slide under and over each other, and thus leave an opening; and upon the gradual cessation of the disturbing cause, the tendency of the "willow leaves" would be to gradually assume their former positions, and close up the spots in a way similar to the closing of the film in the simple experiment referred to. Mr. Brothers also stated that, while observing the moon with his five-inch achromatic telescope at about eight o'clock on the evening of March 25th, he observed a small *dark* body cross the disc diagonally, from left to right, a little below the spot Copernicus. The motion was very rapid and similar to the passage of a luminous meteor across the field of view. He conceived it might be a meteoric body passing through space at a distance considerably beyond the limits of the earth's atmosphere.

Cement of Casein.—Dr. Wagner, in the *Technologist*, recommends the employment of a cold saturated solution of borax, or of silicate of soda, to dissolve casein. The solution of casein by borax is a clear liquid, of viscid consistence, more adhesive than gum, and able to replace in many cases strong glue. Stuffs of linen and cotton impregnated with this solution can be treated with tannic acid or acetate of alumina and rendered impermeable. Marsden, in his History of Sumatra, has shown that the chief cement employed in that country is made from curdled buffalo's milk, and called *prackee*. To prepare it, the milk is abandoned to itself until the cream comes, which is removed by a spoon and washed with water for use. The residual liquid of the milk is sour and thick, and it is this that they call *prackee*. They press it strongly, so as to get it into the form of cakes, which are dried, and become excessively hard. When it is to be used, a certain quantity is scraped off, mixed with quicklime in powder, and moistened with milk. The cement thus obtained is extremely solid, and resists perfectly hot and humid climates a great deal better than glue; it is specially good for cementing porcelain.

To Correspondents.

A. Bowman.—The Art Copyright Act extends to all portions of the British dominions; but no provision is made, so far as we know, for registration in the colonies. To secure copyright, registration must be effected at Stationer's Hall, and residents in the colonies must effect this by means of an agent.

Captain F. (Eastern Bengal).—We have much pleasure in receiving and examining your prints, which, as a whole, are very excellent, and possess a degree of delicacy and softness not common amongst Indian photographs. Nos. 2 and 3 are, as you think, the best, and of these two the latter is best. Nos. 6 and 7 are both excellent. The toning is good; but we fear that your hypo solution has been old or weak, some of the prints showing signs of imperfect fixation, in the shape of yellow spots and patches. We shall always have pleasure in hearing from you.

Orwell.—The chief defect in your cards is a little tendency to under-exposure, and to blackness in toning and printing. Your lens does not do its work quite satisfactorily. Otherwise, the prints have good qualities.

Marsh Photo.—The picture of the sitting figure is very excellent; and the vignette of the child has many excellent points, but indicates the presence of too much top light, by the dark shadows under the nose and chin. 1. The best method of colouring card pictures is by means of water colours; the simplest—that is, the method requiring least skill—is by powder colours. See an article on the use of powder colours in our last volume. 2. Much depends on circumstances. As a rule, if a large window be directly opposite the lens, in taking an interior, it is difficult to avoid a fogged, flat effect in the picture generally, and it is almost impossible to get the detail in such window. A good plan to avoid all this, if circumstances permit, is to cover up the window at the outside with something dark, during the greatest portion of the exposure, and uncover it for a short time towards the end of the exposure. 3. So far as we know, but we have not much definite information on the subject. The cards are posted.

Meniscus.—The small central lens, when added, will shorten the focus of the whole combination, and may be employed where a lens of short focus is necessary. 2. It is probable that the white splash-like marks on your negative are splashes of nitrate of silver, caused by the hasty pushing down of the shutter when some drainings of nitrate of silver are in the groove.

An Amateur.—Acetate of soda, being a neutral salt, will not neutralize acid chloride of gold; but it will set up the action necessary to produce toning. Perfectly neutralized chloride of gold would be apt to decompose and precipitate, if kept in solution; therefore, if an alkaline salt be added to the toning solution, it will not keep. When acetate of soda is added to the solution containing a little free hydrochloric acid, a slow decomposition is set up, in which the weaker acid is displaced by the stronger acid, chloride of sodium being formed, and acetic acid set free. The solution in this condition is very nicely balanced; when the solution has been kept a few days, the chloride of gold is deprived of all, or nearly all, the free acid, but decomposition does not take place until it comes into contact with the print, when the toning action is at once set up. Thus a toning bath prepared with acetate of soda will rarely be neutral to test-paper. If there is reason to believe that the chloride of gold is very acid, it may be neutralized with chalk. A neutral toning bath works well, but does not keep well. The formula with thirty grains of acetate of soda to one grain of chloride of gold was the first one published, and appears to answer well. Manuals of photography, as a rule, have not space for entering into the philosophy of various processes; they can merely give formulæ and instructions. The theory of many operations in photography is not well understood, practice being decidedly in advance of theory. You cannot obtain the general knowledge of principles you desire without much reading, observation, and thought. A careful study of the journals will help you best in this respect. Warming the toning-bath in cold weather is often desirable. Quick or slow toning is much a matter of taste; we prefer slow toning. Prints turning yellow is due to faulty fixation, the hypo being old, weak, or acid. Colouring on albumenized paper is not difficult, if you use the right materials; but it is not a suitable surface for crayons. For this purpose plain paper is necessary. Blowing or breathing on a plate ought not to cause it to blacken all over when the developer is applied; some other cause than that exists.

H. S.—The reproduction of old engravings in which no copyright or property exists is not either legally or morally wrong, but the onus will always rest upon the reproducer of finding out that an engraving is not copyright. In order to ascertain, you must look on the engraving for what is termed the publication line. The Act enacts that every print issued shall have on it the name of the proprietor and the date of publication. The copyright exists for twenty-eight years after such publication. If you copy strictly for your own private use, you do not run much risk in any case.

S. Beverley.—The prints enclosed are very well lighted. The form of room indicated may, if the proportions admit, be arranged so as to give very good lighting; but in a room of small size it is difficult to manage. See an article on the subject in another column.

W. R.—We are not certain. The large print does not appear to have a publication line; and in that case would not be copyright. The picture is one of Creswick's, painted not more than half a dozen years ago, and should be copyright. The small print being cut close does not permit us to ascertain whether the engraving from which it is copied possesses the publication line. The picture is Herring's, and we believe the engraving belongs to Mr. Graves, and is probably copyright.

S. S. C.—The pictures are very excellent. Our publisher will duly attend to the registration.

C. H. F.—The specimen duly arrived; any advice or aid within our province we shall have pleasure in giving; but we cannot enter into any business relations in the matter. We keep strictly aloof from all commercial connection with photographic enterprise. As we before said, we have some doubt as to the existence of prior patent for photographing on uneven surfaces which would probably cover your method.

R. C. H.—It is an entertainment in which the principle of reflection is made available to give the effect of an empty interior to a cabinet which really possesses a partition filling up one half and permitting the hiding of persons behind.

An article on a "Search after the Best Dry Process," a Review of "Whitney's Emblems," and some other articles, are compelled to stand over until our next.

Several Correspondents in our next.

Photographs Registered.

Mr. A. Paul, Putney,
Two Portraits of Otto Goldschmidt.
One Portrait of Madame Lind Goldschmidt.

Mr. F. Otto, Redhill, Surrey,
Photograph of Ten Sheep.

Mr. R. Knott,
Ten Photographs of Bolton-le-Moor Parish Church.

Mr. A. L. Garnier, Guernsey,
Two Portraits of Victor Hugo.

Messrs. Medcalfe and Evans, Cork,
Photograph of Captain Woiswick, 39th Regt.

Mr. Stodart, Margate,
Two Portraits of Rev. J. Drew.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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A SEARCH FOR THE BEST DRY PROCESS.

There are few amateur photographers who have not asked anxiously, "Which is the best dry process?" Many have joined in expeditions in search of it; but very many of these have not had the time, patience, or opportunity necessary for conducting such a quest to a certain and satisfactory issue. The conditions of such a search—if the result is to be of any value—are, first, a capable experimentalist, with unbiassed mind, a comprehensive knowledge of photography, unlimited leisure, patience, and opportunity, and, finally, a high appreciation of the points of excellence in a negative. The last element is very important, as we have known negatives described as perfect—and that by those who are regarded as authorities—which we should consider worthless. If a negative be clean, brilliant, dense, and sharp, there are many who regard it as the *ne plus ultra* of photographic excellence, although it may be entirely wanting in all the delicacy and infinity of gradation which constitute a harmonious photograph. A suitable experimentalist being obtained, he has to test, under their varying phases, the various processes which have been proposed, with sufficient minuteness and care, in order to come to a determination as to which method most completely secures simplicity of working, both in preparation and development; certainty as to cleanliness, and freedom from slipping of the film and blistering, in every plate; the greatest degree of sensitiveness compatible with certainty; good keeping qualities; and, above all, a degree of excellence of result falling as little short as possible of negatives by the wet process. When we consider all that is comprehended in these conditions, it is not surprising that the search after the best dry process has not often, if ever, been carried out as perfectly as might be desired.

We are this week, however, in the fortunate position to place before our readers the results of one of the most satisfactory and exhaustive examinations of the subject which has ever come under our attention—results which, if verified by the general practice of photographers, will leave very little indeed to desire in connection with dry processes either on the score of simplicity, certainty, rapidity, or excellence.

Mr. Russell Manners Gordon, whose pictures are known to all, who have seen his work, as amongst the very few landscape photographs which possess the highest possible degree of excellence, surpassing in delicacy, and equalling in vigour and brilliancy, those of any other amateur we know, has recently undertaken this search after a good dry process, with a rare amount of success. We are not now about to describe the various exhaustive experiments with the various processes he has undertaken. Possibly these may, on another occasion, be placed before our readers. Suffice it now to say, that during the last few weeks Mr. Gordon has exposed upwards of a hundred plates, each one of which was prepared with the utmost care, to test a given point, and its history in preparation, exposure, development, and result carefully recorded. Every proportion of the materials employed which could in any measure affect the result has been varied in proportion and in mode of combination; every degree of washing; every mode of developing, &c., &c., has been duly tried, the results, wherever doubtful, verified by repeated experiments, and the history fully preserved. We have had the pleasure of examining the majority of these test negatives, and comparing them with the annotations, carefully tabulated, which formed their history. We have also assisted in the exposure and development of some of them, and are thus enabled to verify, from personal observation, the record we shall place before our readers.

As Mr. Gordon's aim was not to sustain any foregone conclusion, but to satisfy himself as to which process gave the best results under the most trying circumstances likely to occur in landscape photography, he selected a severe test upon which to expose his extensive series of trial plates. This consisted in a house of a light drab colour, nearly white, in bright sunlight, adjoined by a wall covered with ivy, which was in shadow. It was obvious that, if detail without blackness were secured in the ivy in shadow, and detail without chalkiness in the sunlit white house at the same time, and all this was obtained without veil or fog, all the conditions of delicacy, brilliancy, and harmony would be thus secured. It was upon this subject some plates were exposed, when we were present a few days since, with the most perfectly satisfactory results. To secure perfect detail, softness, and harmony, the exposure required is from three to four times as long as that required for wet plates; to obtain the black shadows and chalky lights, which sometimes are considered tolerable in dry plates, probably less than half the time mentioned might be sufficient. In order to speak in more detail, we may mention the exposures given under the conditions existing when we were present. The light was a somewhat poor, non-actinic sunlight; the lenses a pair of Dallmeyer's rapid six-inch single stereoscopics, with stop a little more than half an inch aperture. The exposure given on the subject we have described was twenty seconds, and would have been, in a good light, about one-third less. Every detail in the ivy in shadow was perfectly made out, and there was not an approach to a chalky light in the picture. The next plate was submitted to trying conditions of another kind: it was tried for portraiture in the glass-house. An exposure of thirty seconds was given with Dallmeyer's No. 2 B, largest aperture. The negative was perfectly delicate, soft, clean, and vigorous, equalling in excellence ninety-nine out of every hundred of those usually produced by the wet process. We saw some equally good, which had been produced a few days before, in better light, in twenty seconds.

We now come to the process itself; and we should explain at the outset, that Mr. Gordon strictly disclaims process-manufacturing, gladly expressing his indebtedness to former experimentalists and discoverers, who have published the results of their labours in our columns. The task which he set before himself was strictly eclectic; he wished to determine which, out of the many processes described during the last few years, he could best rely upon himself for producing results most nearly equalling those of wet collodion. His choice, after this examination, has fallen upon that modification of the collodio-albumen, or Fothergill, process,* with the origin of which the names of Mr. Bartholomew and Mr. Hannaford are identified, and for which Mr. Ackland has recently published an excellent formula, and so admirably demonstrated its value. All details of proportions and manipulation Mr. Gordon has worked out afresh, and, by doing this, has secured formulæ by which he finds that he obtains a degree of certainty, rapidity, and excellence, which no previous formula appeared to yield.

The Collodion.†—A good sample of bromo-iodized collodion is necessary. So far as we know, any good sample will answer, and the more highly bromized, within given limits, the better. The samples used by Mr. Gordon, in his experiments, were Mawson's ordinary wet collodion and Keene's rapid dry collodion. The latter, which contains equal proportions of bromine and iodine, had slightly perhaps the advantage in point of sensitiveness. No preliminary preparation of the plate is, in any case, required, and there is no risk of slipping of the film at all, nor of blistering, except in the case mentioned, in which it is slight, and generally dries without marks. The plates bear the utmost freedom in washing, without risk.

The Nitrate Bath is the ordinary 35-grain bath, very slightly acid with nitric acid. No advantage was gained by the use of acetic acid in the bath of which a trial was made.

The Washing.—The plate, after exciting, is placed in a dipping bath of distilled water, where it remains until another plate is ready; it is then transferred to another dipping-bath of distilled water, where it remains until another is ready; it is then slightly washed under a tap of common water, drained, and coated with the

Preservative Solution, which is prepared for use, at the time, from stock solutions kept ready, as follows:—

No. 1.—Albumen Stock Solution.

White of egg (well beaten)	1 ounce
Distilled water	½ ,,
Liq. ammonia	5 minims.

No. 2.

Nitrate of silver	30 grains
Distilled water	1 ounce

When required for use, take half an ounce of the stock albumen solution (No. 1), and add to it fifteen minims of the silver solution (No. 2), to which, just before use, five minims of liq. ammonia have been added. It is important to remember, however, that the ammonia in the silver solution is not to be added until the time of use, when the former should be measured into the glass, and the fifteen minims of silver solution should be poured into it. If the ammonia be added to the silver, a precipitate is formed, which is afterwards taken up; but time is lost in the operation. The silver and ammonia solution is then added to the albumen solution, and, after mixing, the preparation is poured on the plate, and washed as described. The quantity mentioned is enough for one plate 7½ by 5 inches. It is poured on one corner and allowed to flow slowly all over the plate, and back to the corner where it first was poured on; and then again slowly flowed back all over the plate. It is then poured off, after which it is carefully and evenly washed with one pint of water, poured from a gutta-percha vessel with a fine spout, something like the tin vessel usually employed with oil for lubricating purposes, or to feed oil lamps. It is then slightly swilled with distilled water, and placed away in a perfectly light-tight drying-box, where it is suffered to drain spontaneously.

Development.—This is generally the most interesting, as well as the most important operation, with a dry plate, and is the operation in which very large numbers are spoiled, for lack of patience and judgment. The discovery of the value of a plain pyro solution without silver, made by Mr. Wardley, and given to the world, through our columns, by Mr. Mudd, nearly five years ago, is one of the most valuable aids ever given to dry-plate photography, permitting, as it does, the development of all detail, before any attempt has been made to give intensity to the lights, and thus securing perfect harmony.

The plate is placed on a levelling-stand, and slightly flushed with distilled water: it is then covered with a plain pyro solution, prepared as follows:—

Stock Solution of Pyrogallic Acid.

Pyrogallic acid	96 grains
Alcohol	1 ounce.

Five minims* of this solution are added to half an ounce of distilled water, forming a two-grain solution. In a few seconds, traces of an image appear, and, in from three to five minutes, a perfectly detailed but phantom image i fully developed. Half an ounce more of the pyro solution is now prepared from the stock, and a couple of drops of a citro-silver solution containing of—

Nitrate of silver	30 grains
Citric acid	40 ,,
Distilled water	1 ounce,

are added, and the plate is treated with this. The image then begins to obtain vigour, and the operator must use his judgment as to continuing the development with the minimum proportion of silver, which he will do if there be any trace of under-exposure; or whether, as in case of an over-exposed plate, he will add a greater proportion of silver. As a rule, the gradual increase of the proportion of silver will give the best results. Hurry and impatience in development will ruin a dry plate; nevertheless, it must be borne in mind that an amount of intensity apparently much less than is required in a wet plate, will be sufficient in the dry plate, the non-actinic colour rather than the opacity constituting the density of the negative.

When sufficiently developed, wash and fix with hyposulphite of soda, to which, if at any time the condition of the collodion has caused any tendency to blisters, a few drops of acetic acid have been added.

The colour of the negative is a greenish grey or olive tint. Mr. Gordon frequently finishes the development by a final application of the ordinary pyro and silver intensifier to which acetic acid has been added in place of citric acid, in order to secure the pleasing rich chocolate tint then acquired by the negative.

General Remarks.—These negatives seem as hard in surface as the ordinary collodio-albumen negatives, and may be safely printed without varnishing. Technically, we have rarely seen negatives of such perfect character: without a spot or stain of any kind; without a trace of fog, the portions where the plate was covered by the frame of the dark slide being perfectly bare glass; without a single patch of shadow lacking detail; without a single patch of light absolutely opaque; delicate gradation abounding everywhere.

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* Since this article was written we have received a communication from Mr. Keene, of Leamington, with some examples, from which further evidence is deduced of the excellence of the Fothergill process. Mr. Keene was one of the earliest and most enthusiastic votaries of this process, as may be ascertained from former communications in our pages. He has, since then, experimented very largely with other methods; but for simplicity, certainty, and excellence, returns to his first love. His communication appears on another page.

† As a rule, we shun invidious distinctions, by avoiding the mention of the names of especial manufacturers in articles of this kind; but it is at times necessary, in order to give definiteness and value to the information we lay before our readers.

* Of this alcoholic solution it will be found that 20 drops are required to measure 5 minims. It is imperative, in a process of this kind, to be careful n *measuring* quantities, as the proportions are small, but their operations important.

Their keeping qualities have not yet been tested to any extent, but experiments with this view are in course, and shall be duly recorded. At present we can say that they keep perfectly a week or a little more. One circumstance, which promises keeping qualities, is a little curious. One half of a plate immersed in a solution of chloride of sodium was not found, on development, to be any less sensitive or vigorous than the other half which had not been so treated; whilst one half of another plate, treated with a solution of bromide of potassium, gave scarcely a trace of an image, when the other half was fully done. The final treatment with solution of gallic acid, or acetic acid, very palpably decreased the amount of sensitiveness. Alkaline development gave no advantage, but tended to produce fog; the same is true of hot development.

Much of the technical excellence to which we have referred is due to the neatness, cleanliness, and precision of Mr. Gordon in all the manipulations, and to *his* well-contrived but simple arrangements for securing the plates from risks of which we had intended to speak. This must be reserved, however, for another occasion.

Critical Notices.

WHITNEY'S CHOICE OF EMBLEMS. A Photolithographic Fac Simile Reprint, by A. Brothers. Edited by Henry Green, M.A., with Introductory Dissertation, Essays, Literary and Biographical, and Explanatory Notes. (London · Lovell Reeve and Co.)

One of the most interesting purposes to which photography, as a process, can be put, is the reproduction, in *fac simile*, of that which is beautiful, rare, and valuable, either from intrinsic merit or association. We have often enforced its importance in pictorial and art reproductions, and scarcely second to this is its value in the reproduction of reprints of old and rare literature, the associations and interest of which cannot be fully recalled without the actual presentment of the work in its original dress, with its original illustrations, carrying back the mind of the reader to all the circumstances and belongings of the period, in which the utterances of the old author were first made public. The argument that all literature worth preserving is reprinted from generation to generation, and comes to the common reader in a common or at least accessible form, is of no force as referring to work of this kind. The soul of a good book, the immortal part, is doubtless thus preserved, and we enjoy the intellectual beauties of Shakspeare as much when reading Macmillan's globe edition—the cheapest and most excellent book of the kind ever printed—as we do in reading the folio of 1623. But who does not linger with a loving delight of another kind over the blurred forms of the antique type, the quaint ornamental headings and initial letters of the volume, containing "Mr. William Shakespeare's Comedies, Histories, and Tragedies, published according to the True Originall Copies," and printed by Isaac Haggard and Ed. Blount, in 1623? Certain it is that to the scholar, this is an important element of his enjoyment in the work. Failing the possession of the actual original edition, nothing can for a moment compare in value and interest to a photographic reproduction, in which the unerring pencil of the sun transmits each line and dot of the original, preserving absolute identity, even in blurrings or errors, with more than the fidelity of a Chinese tailor.

Photography proper—as understood, that is, by the ordinary silver printing—could never have been made available to any extent for such work: the slowness and cost of printing would have been barriers; and the uncertain stability of the results would have deprived them of much value. The power of securing a photographic image, and transferring that accurately to the lithographic stone, just supplies the desirable elements of rapidity, economy, and permanency, and renders the accuracy of photography available for such work. The production of the negatives and of the lithographic transfers for this book has been the work of Mr. A. Brothers, of Manchester, with whom commercial considerations in the work have been subsidiary to the labour of love, and the issue is distinguished by the skill and loving care bestowed upon both in the text and the numerous *fac simile* engravings, both from the old edition of Whitney and the numerous other old works, examples of which the editor has given in the admirable notes to the work.

Our chief duty in connection with the work is concluded when we have noticed its relation with our own art; but we cannot let the matter pass without one or two words on the book from a literary point of view. The original edition of this work was first published at Leyden, in 1586, the brightest, richest period of English literature, when Shakespeare, and Bacon, and Raleigh, Spenser, Marlow, Sir Philip Sidney, Hobbes, old Burton, George Wither, and a score of others, all of whose works are household words in our day, were in their prime. It was a period when imaginative literature was supreme; analogies, symbols, emblems, seemed to be the natural order of thought, and in Whitney's *choice* of Emblems we have his selection of the best examples of a class of literature of which the peculiar genius of the age had furnished a rich supply. "An Emblem," good old Quarles, whose work everybody knows, tells us, "is but a silent parable," and in these chosen by Geffrey Whitney we have fine stores of wisdom, expressed with quaint force and much of poetic beauty, which is ever fresh and never wearies. The scholarly introduction, notes, and essays by the editor, and his examination and account of the kindred literature of the period, from the "Ship of Fools" downwards, renders the work exceedingly valuable for its exhaustive character, and will make it a welcome addition to the library of the antiquary and scholar, and all interested in this class of literature.

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ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The Relief Fund—Magic Photographs—The Soiree—Mr. Swan and Mr. Woodbury—Mr. Woodbury's Process—Collodion Printing—Exhibition of Historical Portraits—Exhibition at Ghent—Litho-photography—Coloured Enlargements—Copyright—The Societies.

The prospect of the establishment of a Benevolent and Provident Society for Photographers is increasing daily. It has already been stated that a gentleman has offered to contribute twenty pounds if twenty others will be equally generous. I am happy to say that several names have already been sent in from gentlemen offering their contributions to the fund, which will constitute the donors life members. To suit the pockets of those who cannot afford to be so liberal, and yet would regret the absence of their name from so good an object, a writer in the News has suggested that one hundred photographers should contribute five pounds each. With this money as a nucleus, a society may be formed, which, if properly managed (and there is every reason to hope for this), would be the means of doing incalculable good.

Only a week or two ago we were startled with a strange advertisement in all the papers, headed "Magic Photographs! Surprising Amusement!! Everybody his own instantaneous photographer with a few drops of water!!!" and, as a *climax*, "In your own drawing-room!!!" Here was that crowning invention which would do away with the hot and dazzling glass-house and the professional photographer; which would enable everybody—possessed of thirteen stamps and a "few drops of water"—to produce their own portraits. The secret, not to say the "sell," is by this time well known to all photographers, and really is a not illegitimate method of doing a little of the business of which photographers are complaining they are short. There is one thing about this toy to which I very much object. The image being invisible, you never know what you are going to develop, and consequently do not know who to invite to see the operation. Many of the latent images have come from Germany, and have been characterized by some foreign notions of what is considered art or delicacy, or fit subjects for "the drawing-room." One of the prepared subjects which has come under my attention would have been much better left in the obscurity of a latent image.

There will be no formal exhibition of photographs in London this year. The results of the later exhibitions have shown that an undertaking of this kind could only end in a loss, which would seriously endanger the funds of the Society. As the best substitute they can offer, the Council have determined to give a Soirée at King's College some time in May, and invite photographers to contribute the pictures they would otherwise have sent to the annual exhibition. The day is not yet fixed, but the cards of invitation to Exhibitors and Members of the Society will be issued shortly.

I have heard, from time to time, during the last month or so, of a case, or an argument, or a hearing, or whatever the legal name for it may be, before the Solicitor-General, between Mr. Swan and Mr. Woodbury, on the subject of the new printing process. This affair has not come on and been argued and done with, and there an end, but has been constantly put off, illustrating forcibly (and it ought to be a warning to all litigants at the outset) one form of the law's delay and cost. The last hearing was on the 24th, and the case was again adjourned for further evidence. As far as I understand the matter, when the Solicitor-General's decision has been given, and to whatever end it may be given, both parties will be in the same position as when they began, as it decides no point as to the legality of the patent—the object of the one party, I believe, being to prevent the other *dis*claiming certain points in his patent—but it will possibly clear the decks for action. There can be no doubt but that if they once get safe into Chancery, it will be easier for them to wish themselves out of it than to get quite clear of the grip of the law, and the loss of much money, time, and anxiety must be the consequence. I have too much esteem for both the gentlemen concerned to believe that they have such a preference for oyster-shells that they should voluntarily ask the law to eat up the dainty mollusc, and be content themselves with its calcareous envelope.

Touching Mr. Woodbury's process, I may mention that a few days ago the inventor put a print into my hands, from a negative by Mr. Sarony, which, had I not known how it had been produced, I should have supposed was a very fine carbon print; and in comparing it to a carbon print I am putting it beside, as far as half-tone and delicacy are concerned, a much more vigorous test object than an ordinary silver print. I have seen a large number of different subjects by this process, and the last done has always been the best.

A new fashion in printing has been in vogue in Paris for some time, and is now cropping up here and there in England, notably at M. Disderi's establishment. The method consists, briefly, of a transparency taken on a wet plate from the negative, toned, and tranferred to paper. There is no doubt that delicately beautiful effects may be obtained by this proceeding; but if silver printing on albumenized paper is to be doomed, as I believe it will be, would it not be better worth the while of photographers to turn their attention to maturing the details of the carbon process —which in time must supersede all others, and which produces pictures that will be preferred by many to the glazed surface of pictures produced on collodion or albumenized paper—rather than to the difficulties of a process which does not appear to possess a greater element of permanence (commercially) than a passing fashion.

The exhibition of historical portraits which has been in preparation for so many months is now open at South Kensington, and is well worthy of a visit by portraitists, who might get many hints to aid them in the practice of their art from a careful and appreciative inspection of these works. Beginning with the reign of Henry I., with a portrait of "Fayre Rosamond," the illustrations of the practice of the art of portraiture in England are brought down to the time of James II. It is proposed to continue the collection of national portraits next year from William and Mary to the present time. It will be interesting to photographers to know that arrangements have been made to photograph every picture. In those instances where the portrait is remarkable for its colour, either as a work of art or in costume, it has been determined to issue coloured copies.

Here is another chance for the medallists, or those who are desirous of becoming candidates for the honour, which is not so difficult to obtain now-a-days as it was formerly, when the much prized Edinburgh medals attracted the largest and best collections of illustrations of our art that have ever been got together. An International Exhibition will be held in the autumn at Ghent. The terms are very easy for exhibitors: there will be no frames to provide, and no carriage to pay. Medals will be given, and the committee announce their intention of purchasing a large number of the prints contributed. The names of the members of the commission are well known to photographers at home and abroad, and are a sufficient guarantee that the exhibition will be well carried out.

The latest born of the many photo-lithographic processes—that discovered by the Messrs. Bullock—has been brought prominently before the public during the month. As in the case of Mr. Woodbury's invention, and, indeed, as is the case when any novelty has to be brought forward, the News was enabled to present to the world the first published results, by which its readers would be able to judge for themselves of the success attained in solving that most difficult of problems, the rendering of photographic half-tone by means of a printing press.

Coloured enlargements are yet far from being the perfect works of art they should be. There is a striking anomaly in most of the pictures of this kind we constantly see exhibited, which consists in the most perfect and masterly drawing, as given by the photographer, wedded to the most detestable colour as applied by those who choose to take to themselves the higher name of artist. It is true there are exceptions—some few in Mr. Mayall's collection, for instance—to these remarks, but the majority of coloured enlargements appear as if they had been copied from leather. Would it not be well to recollect that there is such a thing as flesh in a face, and that it should be represented? The colourist too often neglects nature altogether in his work. It is not always possible to get the original of the portrait to sit for the colouring, but the painter should remember that he has all the likeness and drawing in the photograph, and that complexion can be supplied by another model; or at least, it would go far to improve the photographic colourist's work if he could always have nature before his eyes, even if it was not the particular example of nature it was his duty to represent.

A curious case of copyright—Woods *v.* Highley—has occurred. Mr. Highley copied a set of book illustrations for the magic lantern, which illustrations were copyright. So far from imagining he had done wrong, he invited the author of the designs to see them. It appears that the owner of the copyright, who was not the artist, hearing of the copies, sent his agent to purchase a set, upon which he brought an action in the Court of Chancery, and obtained an injunction against Mr. Highley. This appears to have been a very harsh and cruel proceeding, but it shows that when property belongs to one person it is not lawful for another to attempt to possess himself of any part of it, however innocent his intentions may be.

At the Photographic Society of London, Mr. Cooper gave his formula for printing on silk, and Mr. E. Bullock read a paper on Litho-photography, illustrated by some excellent specimens of the process. Mr. Edgar Cox exhibited and explained the construction of a new perambulator tent, by far the most complete and useful contrivance of the kind that has been exhibited.

At the North London, a paper, by Mr. Edward Seeley, on Toning with Gold and Carbonate of Magnesia, was read by Mr. Ackland, by which method it was stated that a much larger number of prints could be toned with the same amount of gold than with any of the old processes. The testimonial to Mr. Barnett, the Hon. Sec., which I mentioned in the last "Echoes," and which took the form of a very handsome clock, was presented.

The proceedings of the South London Society were opened by the Chairman stating that he had received a letter from a member of the Society, Mr. Jabez Hughes, protesting in strong terms against the Society being used as a vehicle for expressing the personal feelings of members, as was done in a paper read at the last meeting. The author of the paper protested against a member who was not present when the paper was read, and who, as he was pleased to say, obtained his information from garbled reports in partisan journals—a ridiculous observation to make, as in the News, as all its readers know, the paper was printed *verbatim*; and as the letter only alluded to the paper the report did not affect the question; but the Chairman, to avoid reviving an unpleasant subject, put the letter in his pocket, and the subject dropped. Mr. Sebastian Davies read an excellent and well thought out paper on "Dry Processes," which tended to make still clearer the theory and practice of the Fothergill process.

The Photographic Society of Scotland held no meeting. It would be a cause for infinite regret if this, one of the oldest and most influential of societies devoted to the interests of our art, should fail in the energy it has formerly exhibited.

RECOVERING THE GOLD FROM OLD TONING BATHS.

BY WILLIAM ENGLAND.

As is well known, most toning baths, after being used some time, become useless. A ready way of recovering the gold for use again—and which in my hands has proved the best of the various methods tried—is as follows:—Precipitate, as is usually recommended, by the sulphate of iron. Well wash the deposit, and place it in an evaporating dish; add nitric acid, and boil for a quarter of an hour. Usually it is recommended to wash with dilute sulphuric acid, to get rid of the last trace of iron; but, as the deposit contains a considerable amount of silver, I prefer the above method of boiling with nitric acid, as by this means we get rid, not only of the iron, but separate the silver, which has been thrown down with the gold, at the same time. After boiling, as before mentioned, and allowing to cool, dilute with water. Let the precipitate subside, and pour off, saving, of course, the liquid, from which the silver may be thrown down as chloride in the usual way. The purple precipitate of gold may, after one or two washings, be treated with aqua-regia, and evaporated, and as fine crystals will be obtained as from pure gold.

The amount of silver dissolved out of the prints during the toning operation is considerable, even if unusual care has been taken in the previous washing. I have found that twelve ounces of precipitate contains about two-thirds silver and one of gold. I speak now of carbonate of soda toning, my experience with other methods not being sufficient to enable me to say if the results are the same. The above method will be found extremely simple. I consider the boiling with nitric acid to be absolutely necessary, as, so long as the gold is locked up in combination with the silver, it is impossible to get fine crystals of chloride of gold.

I should like to know if any of your correspondents have tried the treating of fixing solutions as recommended by Mr. Carey Lea. I must say that, in my hands, it has not produced successful results. Into about two gallons of old hypo bath, well saturated with silver, I placed a large piece of copper. After some days there was but a small quantity of precipitate, with the exception of that on the copper in the metallic form, and which it was impossible to separate without dissolving the copper. After the action of the metal upon the solution for weeks, the whole of the silver was not precipitated, and had to be thrown down, in the ordinary way, by sulphuret. Perhaps others have been more successful.

RAPID FOTHERGILL OR ALBUMEN PROCESS WHICH QUICKLY DEVELOPS.

BY ALFRED KEENE.

Three things have materially tended to deprive the Fothergill process of the great popularity it for a long time so justly possessed; viz., long exposure and slow development, as compared with the wet, and the necessity, to ensure constant success, of an amount of careful preparation not generally bestowed by dry-plate photographers. All the methods of practising it hitherto recommended have been more or less open to these objections, and other processes introduced to replace it have either been subject to one or more of them, or others equally great. Even the collodio-albumen process, which, in the hands of its skilful advocate, Mr. Mudd, has produced pictures which, for excellence, have been pronounced unequalled by any other dry process, and never exceeded by the wet, increased in sensitiveness as it has been by Mr. Wardley's valuable method of developing, requires a longer preparation, exposure, and development, than most amateurs are now willing to give.

It is evident that a dry process, to become popular, must possess the following characteristics:—The plates must be quickly and easily prepared, uniform in quality and character, and the exposure required and time occupied in developing not very greatly exceed that of the wet process, to which should be added a capability of producing negatives the character of which shall be largely under the control of the operator during development.

A process possessing these desiderata would be a boon to photographers generally, both amateur and professional, and probably cause dry plates to be used to a greater extent than ever before, and for purposes for which they have been heretofore unsuitable. Thanks to the efforts of those who have so persistently advocated the use of bromides in the collodion, to the discovery of alkaline development, and the principle of washing off the preservative, these desiderata are in a fair way of being, if not already, accomplished.

I find I can, with a highly bromo-iodized collodion, alkaline albumen preservative, and by well washing, both before and after applying it, produce plates possessing the above-named qualities. I was engaged experimenting with bromides, when Mr. Ackland's recent modification of the Fothergill caused me to turn my attention to that process, and pursue investigations in a direction long since abandoned; viz., the practicability of using for it an increased quantity of bromides in the collodion. Formerly this appeared to me impracticable, from the great tendency to fog and decomposition it produced; but I have since ascertained that this may be entirely avoided by so far departing from the Fothergill process as to wash away all free nitrate before applying the preservative. I will not trouble your readers with the experiments, but, briefly as possible, describe the method of preparing the plates which has appeared to me most satisfactory.

Bath, ordinary 35-grain, neutral or slightly acid, as used for the wet process.

Collodion containing equivalent of the bromo-iodide salts.

India Rubber solution, containing 1 or 2 grains in each ounce.

Prepared Albumen, made with 1 part white of egg, 2 parts distilled water, and 6 or 8 drops to each ounce of strong liquor of ammonia added. Place the whole in a glass or earthenware vessel, and stir frequently, so as to avoid producing froth, with a glass rod or silver spoon, until the albumen becomes thoroughly mixed. If required for immediate use, strain through muslin; or if not for several hours, pour into a bottle to settle, and use the clear portion. It will keep for weeks, or even months, if well corked. This plan of mixing was introduced by Mr. Ackland, and is far superior to the old one of agitating to a froth.

Provide well-cleaned glasses, which are to be preferred when roughed or ground at the edges, coat them, or the edges only, with india-rubber, and, when quite dry, with the collodion. Excite in the ordinary way, remove, and place in a dish of distilled water, while a second plate is coated and placed in the bath; then, if greasiness has disappeared, wash, with gentle agitation, in two or three changes of hard water in another dish, or in successive dishes. Apply the prepared albumen either by fixing the plate to a pneumatic holder and pouring it on and off several times, or in any other convenient way. Wash off the albumen in two or three changes of common water; finally flush with distilled water; drain, and dry as quickly and evenly as possible.

Expose about as long again as a wet plate. Develop with the ordinary pyro and silver, moistening the film with distilled water previously; or prepare the following solutions for the purpose:—

No. 1.—	Pyrogallic acid	2 to 4 grains
	Distilled water	1 ounce.
No. 2.—	Nitrate of silver	15 grains
	Citric acid	20 grains
	Distilled water	1 ounce.

Two or three drops of No. 2 to be added to each drachm of No. 1, to be changed if necessary; and also more or less of No. 2 used as required. When the temperature is high, it may be found desirable to add a few drops of glacial acetic acid.

The following method of developing is recommended:—If there is reason to think the plate has been under-exposed, a short exposure desirable, or the light very dull, prepare:—

No. 3.—	Pyrogallic acid	4 to 8 grains
	Distilled water	1 ounce.
No. 4.—	Carbonate of ammonia	2 grains
	Distilled water	1 ounce.
No. 5.—	Bromide of potassium	20 grains
	Distilled water	1 ounce.

Mix equal parts of Nos. 3 and 4, and apply to the previously moistened film. If the picture immediately shoots out, add one or two drops of No. 5, and continue the application until the details are well developed, then thoroughly wash. Flush with distilled water, and pour on and off a few times distilled water containing in each drachm two or three drops of No 2. Mix this with equal portions of No. 1, and continue the application until sufficiently intense, changing the developer or increasing the quantity of silver solution as necessary.

The keeping properties of the plates I have not had an opportunity of severely testing. Those kept nearly a month have not shown the slightest deterioration, nor should I expect to find them do so after a very much longer time. No doubt maximum keeping properties could be obtained by soaking the washed plate in a weak bath (2 or 3 grains to the ounce) of bromide of potassium before applying the albumen. This would slightly reduce sensitiveness.

The above will, I think, recommend itself for the facility and certainty with which it may be practised, and be found sufficiently sensitive for all ordinary dry work. In an early future number I hope to describe a very much more sensitive modification with bromized collodion, little, if any, inferior to the wet. At present, it appears to require greater skill and care to ensure uniform success, which, for general use, neutralizes the advantage of superior sensitiveness; but it may not prove to do so upon further examination, when my experiments are completed.

Leamington, May, 1866.

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ON THE NEUTRALIZATION OF THE ACID SILVER BATH WITH CARBON OF LIME OR CHALK.

BY DR. H. VOGEL.

It has for years been customary to neutralize the acid of silver baths with chalk, and it is still repeatedly recommended. It appears to be regarded as a settled fact, that chalk in all cases neutralizes the acid, and exercises no pernicious effect on the silver baths. Both are mistakes. Lately, as I was about to neutralize with chalk some fresh baths which were too strongly acidified, it struck me that there was a precipitate of iodide of silver from them, although I knew that they were by no means saturated with the latter. I suspected that this iodide of silver precipitate might proceed from a diminution of lunar caustic in the baths, occasioned by the chalk. (We know, of course, that baths with little silver do not dissolve iodide of silver as well as those with abundance of silver).

In order to prove the point more exactly, I took a solution of silver, determined exactly its contents with my silver test; and it amounted to 8·6 per cent. I then shook the whole (about 40 cubic cent.) with 1·1 grain ground chalk, and let the whole stand for twenty-four hours. Afterwards I tested the solution again as to its amount of silver, and found that it contained now only 2 1 per cent. Thus one sees how, through the addition of chalk, silver salt is eliminated. The experiment was repeated, and a 5 per cent. solution of silver, shaken for ten minutes, with chalk-dust. The silver contents sank to 0·7 per cent. Carbonate of baryta has the same effect. If chalk is added only in small quantities, the loss is not so important. Yet the question remains, whether through the shaking with chalk the chief aim is attained—the neutralization of the bath.

If the acid is acetic, this is, perhaps, the case; though acetic acid is neutralized very slowly by the chalk. But this is not the case if the bath contains free nitric acid. Here nitrate of lime is formed, and this in no way reacts as a neutralizer, as many may think; but as acid, even when it has been boiled with an excess of chalk. A perfect neutralization of the bath is thus, in this case, impossible, as we ourselves have experienced in the case of our bath.

The neutralizing of the silver baths is, therefore, much better attained by employing carbonate of soda. Take of it a solution 1 : 10; add some drops of it to the bath which is to be neutralized, till there arises by the shaking a remaining weak precipitate; and then filter.

Herr Remelé recommends oxide of silver and carbonate of silver for the neutralization of the acid in the bath; but these are not practical, inasmuch as their action is very slow.

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THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Silver Printing, and Toning Operations.

If no further proof could be offered to show that our knowledge of the principles involved in silver printing, and the subsequent operation of toning, is defective, the continued pursuit after some system which will give results at once certain and satisfactory is sufficient of itself to convince the most superficial thinker that an extended acquaintance with these perplexing subjects is as necessary as it is evidently desired.

Taken as a rule, uncertainty in photographic action is the offspring of ignorance, which removes the leading strings from the hand of the conductor. Admit the fact that an operation once successfully carried through offers no reason why the same should not produce like results again and again, and you are in a fair way towards believing that a reason why exists, if a renewed experiment results in failure; and a successful effort in tracing out that *reason why* is a vast stride towards a perfect knowledge of the principles which, when intelligently applied, lead to the fascinating goal of success.

If we accept, as a criterion, the thousand and one formulæ for silver baths and toning solutions which are scattered over the pages of the innumerable photographic publications, then is our case hopeless indeed; for instead of a few simple principles, we must assuredly believe that of all phenomena under the sun, none involve conditions so ramified and complex as those which lead silver printing to a successful issue.

One experimentalist ascribes his success to a weak sensitizing bath, and the addition of lime to his toning solutions. Directly starts into notice another, who attributes his recent failures to a precisely similar procedure. Another triumphantly asserts that he has secured magnificent results from the use of some organic or inorganic adjunct to his silver mixture. He is met by the doleful recitals of a series of failures derived from an adoption of the offered formula. And so the waves of discrepancies in collective experiences roll on, and we sigh and sigh for a photographic elixir which is free from caprice, and is qualified to work for all alike.

Courteous reader! a word in your ear. The troubles I have enumerated arise chiefly from the magnified view you take of the principles brought into action; you regard them as capricious monsters, when they are at all times ready to become your obedient slaves, if you lead them through right paths; but if you bother them by adding a lot of empirical rubbish, instead of assisting them, as you vainly fancy, you are throwing down impediments which will surely block the way. Accept this word of advice. If Mr. This One or Mr. That One suggests some new agent, think well of the suggestion, for he means well; but don't accept the suggestion until, by reflection, you are convinced that the subject introduced possesses power to aid; for it frequently happens that certain substances are recommended which play no earthly part in securing the advantages described; such (to select a recent example), I regret to state, is, in my estimation, the addition of carbonate of magnesia, as described by Mr. Seeley.

If I yielded to my natural self, I would rather endorse a statement than question its veracity; but I hold that no man who seeks and loves truth should fear to give offence; nor should he take offence from retaliation, if the light (imagined or otherwise) is offered with becoming courtesy. It must not, therefore, be imagined that I approach the gentleman named in a spirit of antagonism; on the contrary, I freely give him unqualified credit—first, for the research; second, for the generous way in which he made the results of his labours public.

It would be a mere waste of time and space were I to reiterate what I have so frequently written in former papers. Suffice it here to state that the advantages derived from the use of carbonate of magnesia arise, *not* from any particular virtues possessed by the last-named, but, because of its comparative insolubility, the danger of its excessive alkalinity is prevented; and the *reason why* the solution described will only work under special conditions is, by reason of its being favoured by the presence of alkalinity at all. A small amount of free acid favours decomposition of gold. "Yes," says an objector, "and adds mightily to the likelihood of mealiness." Stay! What produces mealiness? Bleaching. What causes bleaching? Liberated chlorine. Then drive off the excess of chlorine by administering a dose of boiling water, and you destroy the active enemy.

At the meeting before which Mr. Seeley read his paper it was expressed, as an opinion, that the number of sheets toned by the new bath, with one grain of gold, is "unprecedented." So far from such being the case, I have long produced like results daily, not with certain samples of paper, such as Saxe (which is by far the easiest to tone), but with Rive and Saxe alike; in summer heat and winter cold, without the application of any warming method, which, after all, only performs a part rendered necessary by alkalinity. Methinks I hear the reader exclaim, "I should like to secure the formula that possesses such wondrous virtue." Pshaw! courteous reader, send your never-varying formula to the winds. Strive to master principles. Think. Keep your eyes open, and your judgment awake. It is not formulæ; it is a continued exercise of observation; it is going beyond the mechanical, or pounds shillings and pence; it is making your work a labour of love; it is believing that printing operations require intelligence; it is giving *them* a constant place in your thoughts instead of sending *them* out of a garret window, to be cared for only by a small boy, or ill-paid, ignorant assistant; for no matter whether silver, or any other mode of printing, is destined to hold a place, present or future, no photographic print can or ever will be produced at will, except intelligence be the guiding hand. Formulæ must be varied to meet varying contingencies; and judgment is the only power that can point the way. A lack of cultivated judgment is the leading reason why of many a failure.

Turning from a consideration of formula, I approach the mechanical by a brief consideration of the remarks lately offered by Mr. Cherrill on sun-printing. The remarks alluded to must be so fresh in the minds of my readers that I need not repeat them; suffice it here to state, that for three reasons sun-printing is, in my experience, to a certain extent, a mistake:—

First. It is wrong in principle.

Second. It is impossible in extensive practice.

Thirdly. It is (save under conditions to be described) unnecessary.

It is wrong in principle, because, be a negative ever so perfect in bright sunshine, the light penetrates the densest portion of the negative to an extent disproportionate with the effects produced under like conditions on the deeper shadows. Proof. If I print from a negative where the density of the highest lights is out of proportion with the other portions of the picture, I print in bright sunlight. Why? To produce a greater uniformity. Then if, with such a negative, sunshine imparts softness to the resultant print, it stands to reason that, under similar treatment, a perfect negative would yield a flat, unsatisfactory picture, by reason of the high lights being finished before the necessary depth of shadow has been secured.

In an extensive practice, general sun-printing is impracticable, for, with some 140 or 150 frames, a rare "roast" would follow such a practice.

It is unnecessary. If the conditions needed in toning operations are understood, there need follow no great amount of reduction in the toning bath, and absolutely no reduction in the hypo; and if the colour imparted to the prints be derived from real precipitated gold, instead of going back to red, it darkens under the action of the fixing agent. And here I would observe, the notion that a large batch of prints go darker than a small one is an erroneous one. That a large number can be toned with a smaller proportionate amount of gold I grant; but the reason why a small number of prints seem to go redder than a large one is that, as a rule, among extensive practitioners, the small number have been printed in a duller light, which exercised a vast influence on toning movements.

Prints when produced by a clear, active light, and a dry atmosphere prevails, tone quickly, and with a small amoun of gold; while with an atmosphere saturated with moisture, and a dull, murky light, toning goes on slowly, the prints lack brilliancy and vigour, and a stronger toning solution is requisite to tone quickly, although, where time is no great object, I say tone slowly with a weaker bath.

And now, in conclusion, one remark on the suggestion from a French amateur, contained in the interesting letter of M. Lacan, the foreign correspondent to the News. The amateur in question counsels the use of albumen, minus any added chloride salt. I counsel that no such plan be adopted, save for instructive experiment. The pure albumen unquestionably contains salt, but not sufficient for photographic printing purposes. I have tried it, and for years have been acquainted with the results—a hard, half-toneless, pitiful, object. What is secured resists the action of the toning solution and hypo, which fact offers a *reason why* a sun-printed picture is more firm than one produced in diffused light; an organic compound of silver and albumen, for example, is less sensitive than the chloride; on the other hand, it is more stable: hence the *reason why* a print in sunlight is most permanent when exposed to a reducing agent, as under such treatment a greater portion of the organic matter has been reduced.

And now, having run my usual length, I drop the subject of printing, to cogitate on the most reasonable method to be adopted for obtaining a larger degree of sensitiveness in the camera. The conclusions arrived at must remain over until my next attempts to show the Reason Why.

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THE CASKET MINIATURE IN RELIEF.

Mr. Henry Swan, the inventor of the charming and novel form of stereoscopic pictures which he has styled Casket Portraits, has sent us the following:—

"Having been often asked for such information as would enable an amateur to produce negatives suitable for the casket miniatures, I have great pleasure in forwarding the following instructions, which also include all that is needful for such professional photographers as may not care to undertake the more lengthy processes of printing, tinting, and mounting the transparencies with the precision and delicacy which these extraordinary images, so perfect in themselves, imperatively demand.

"For those who prefer to execute every part of the process for themselves, I propose to send next week an account of the method adopted by myself for the printing and mounting.

"Instructions for Taking the Negatives.

"The portrait-negatives required for the production of the Patent Casket Portrait are exactly the same as those for an ordinary stereoscopic pair, excepting that the distance between the two positions of the camera must be increased to about one-sixth or one-seventh part of the distance that the camera is from the sitter.

"1. Any camera that will take two pictures on a single plate will answer by taking one picture at one end of a board fixed to the top of the tripod, and then shifting the camera to the other end of the board before exposing the other half of the plate; but care must be taken to stop any slight vibration caused by the movement.*

"2. *The background* may be quite plain, or a subdued diaper pattern may be used at a distance of not more than three inches behind the head. Scenic backgrounds are inadmissable.

"3. *The best position for the sitter* in this kind of portrait is when the eyes are directed to one of the cameras, though it is not necessary that the portrait should be absolutely full-face. The size of image is not material; half-length or three-quarter figure carte de visite preferred.

"4. The negatives should not be too dense, as such do not print well on glass.

"40, *Charing Cross.*"

HOW TO ANALYZE COLLODION.

BY PROF. TOWLER.*

The description of means whereby to determine the nature of the salts contained in collodion will, we think, be acceptable to our readers in general. The method of analysis here presented makes no pretence to great refinement, and, consequently, the deductions are referable only to a qualitative determination.

It is desirable to know what salts have been employed in the preparation of a given collodion.

Measure out ten drachms of the collodion, and add to it the same quantity of rain-water, and shake the mixture gently. The result of this proceeding will be the precipitation of the pyroxyline, which is insoluble in water, as also in the dilute mixture of ether and alcohol.

Place a clean filter in a glass funnel, moisten it all over with rain-water, by nearly filling it with this liquid, and then pour it out again. Now shake the mixture of collodion and water, and then pour it upon the funnel and allow the filtration to proceed until it is complete.

Add water to the filtrate; if this addition produces precipitate, add still more, and filter the milky liquid again through the same filter. The gun-cotton will remain on the filter, whilst the liquids, holding in solution the mixed salts, the iodides and bromides, will pass through the filter and be caught in the vessel beneath.

Our first task now is to find out whether the collodion contained simply iodides, or a mixture of iodides and chlorides, or of iodides and bromides; secondly, we wish to ascertain which bases have been used—that, is, whether potassium, sodium, lithium, ammonia, or cadmium, &c.

Divide the liquid into two portions.

Place one of these portions in a colourless glass bottle capable of holding about twice as much.

Take a small Florence flask, fit a good clean cork to the neck, and bore a hole through the middle of the cork, either with a cork-borer or the blade of a penknife, large enough to receive the end of a glass tube. This glass tube has to be bent twice at right angles, and one leg must be longer than the other. The shorter leg is firmly pressed into the orifice of the cork, so as to fit tightly in the aperture.

Pour into the Florence flask about an ounce of hydrochloric acid, and afterwards about an ounce of the black oxide of manganese in the form of powder. Shake the mixture well, so as to bring all the powder into intimate contact with the acid. Adjust the cork in its place, and place the outer and longer end of the tube in the neck of the bottle containing the filtrate, but do not insert the orifice of the tube in the liquid. In this condition let the Florence flask rest on the ring of a retort stand, and apply to the botton of the flask the heat of a spirit-lamp or of a small charcoal fire. By this means the hydrochloric acid becomes decomposed into its elements, hydrogen and chlorine. The former combines with an equivalent of oxygen abstracted from the manganese, and thus forms an equivalent of water; but the chlorine passes out through the tube into the bottle, and, being heavier than the atmospheric air within the bottle, drives it out. Chlorine, thus coming in contact with the iodides and bromides in the solution beneath, decomposes them, combines with the bases, and sets iodine and bromine at liberty. To facilitate the decomposition, the bottle is shaken every now and then. Great care must be taken not to allow too much chlorine to be used, otherwise a compound of chlorine and bromine would ensue, which would mar the experiment by destroying the colour first produced. This colour is owing to the presence of free iodine and bromine.

Remove the Florence flask from the tube, and add a few drachms of ether to the liquid. Cork the bottle, shake it well, and then set it aside for a minute or two to settle. The ether dissolves the bromine, and the solution, being lighter than the dilute alcohol, rises to the top, and forms an intense red solution, which is easily separated by means either of a small glass syringe constructed of a glass tube, or of a small separating funnel furnished with a compressor for such purposes.

This intensely red etherial solution indicates the presence of bromine, and consequently of a soluble bromide in the collodion experimented upon. The bromide may be separated from the ether by first converting it into the bromide of potassium by adding caustic potassa to the solution until the colour is removed, and then by submitting the now colourless solution to distillation by means of the heat of a water bath. The ether passes over and is collected in the receiver kept cool by a mixture of pounded ice and salt. The residue may be evaporated nearly to dryness, and then set aside to crystallize The crystals will be those of bromide of potassium.

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* The board may be one inch thick, and, for ordinary short focus carte de visite lenses, thirty inches in length. It should have a slight ledge along the front edge, and a slip of wood, fastened by a screw through the centre, across each end of the upper surface. These slips serve as stops for the camera, and enable it to take its right position at either end of the board.

* *Humphrey's Journal.*

But if by the action of chlorine, and the subsequent treatment with ether, no intensely red solution rises to the surface, it may justly be concluded that the collodion contains no bromide.

Having become convinced either of the presence or absence of a bromide, we next look for the iodides. The coloured portion of the liquid that did not combine with the ether and rise to the top, is a solution of iodine in alcohol and water. Distil the solution; at the beginning the ether, alcohol, and iodine will pass into the condenser, until finally the residual liquid is quite colourless and almost without odour. When this is the case the distillation may cease. The distillate—that is, the liquid portion in the receiver—will be of a wine colour, being, in fact, dilute tincture of iodide.

The iodine that has thus passed over may now be converted into the iodide of potassium by adding a solution of caustic potassa to it until the coloured material is all taken up and rendered colourless. The liquid is then evaporated nearly to a syrupy consistence, and then set aside to crystallize.

Experiment No. 1.—Dissolve a little of the crystallized salt in water, to which add a few drops of a solution of bichloride of mercury: a red precipitate indicates the presence of a soluble iodide in the original solution, thus producing the beautiful pigment, iodide of mercury.

Experiment No. 2.—Dissolve a crystal or two in another portion of water, to which add a few drops of a solution of acetate of lead; this will produce a rich yellow precipitate, which is likewise used as a pigment; it is iodide of lead.

If chlorine, at the commencement, has been introduced with care and experience, all the iodides and bromides would have thus been removed, and, in this case, our next duty is to ascertain whether the collodion contains any soluble chloride, which may sometimes be found in simply iodized collodion. But it is evident we cannot use the solution we have just been operating upon, because we have been introducing chlorine in two instances, in order to substitute this element for iodine and bromine by forming chlorides with the bases with which they were in combination.

To be brief, there is no easy and quick method by which a chloride can be shown to be present in collodion, containing, at the same time, iodides and bromides. If the collodion is found to contain no bromide, made manifest by chlorine and ether, as above described, add to the solution nitrate of silver as long as any precipitate is formed. Wash the precipitate well, and then add ammonia. The chloride of silver, if present, is easily dissolved in this menstruum, but the iodide of silver is but sparingly soluble in it. Whilst there is still a portion of the precipitate undissolved, pour off the ammoniacal solution, and evaporate it to dryness. If, when dry, the residue is white, it is a strong evidence that this residue is chloride of silver. To be certain about the matter, expose the white residue to the direct rays of the sun. If the substance be chloride of silver, it will *very quickly* assume a violet tinge, otherwise not.

Bromide of silver is soluble, with difficulty, in ammonia; so that, in case soluble bromines, iodides, and chlorides are all supposed to be present in the solution obtained by filtration from the collodion, it is advisable to precipitate all of them by nitrate of silver, and to dissolve out the chloride of silver by means of ammonia, and to test for the chloride as above described. There is no doubt as to the conclusion to be drawn from the results of this experiment, as regards a qualitative analysis, although it is far from being accurate when we aim to obtain a qualitative determination of each of the elements sought for.

Having thus ascertained either the presence or absence of iodine, bromine, and chlorine, we proceed a step further, and aim to determine what sort of bases are present. To do this, take an ounce of the portion of the filtrate set aside for future analysis. Evaporate it to dryness. Mix a small quantity of the dry residue with about an equal quantity of caustic potassa or powdered slacked lime in a small mortar, add a drop or two of water, and rub the materials together—the smell of ammonia will indicate this base with great certainty. The absence of the ammoniacal smell is equally a certain test that ammonia is not present.

Take another ounce of the original filtrate, and pass a washed current of hydrosulphuric acid (sulphuretted hydrogen gas) through the liquid for a short time; if a yellow precipitate is produced, it will indicate that cadmium is a base of some of the salts used in the collodion. It is true a yellow precipitate might indicate the presence of arsenic; and if there is any doubt upon the subject, wash the yellow precipitate and treat it with dilute ammonia. If it is quite soluble in this alkali, the metal arsenic is present in the collodion; if, on the contrary, the yellow precipitate is insoluble in the dilute ammonia, it indicates that the precipitate is derived from cadmium, and not from arsenic.

If, however, hydrosulphuric acid produces no precipitate in the original filtrate, there are no bases present in the collodion excepting those of the alkalies or alkaline earths. Ammonia may be detected as already described. Other bases than these might be present, it is true, but then they are such as are not used in the preparation of collodion; and, indeed, those of the alkaline earths may also be omitted. We therefore proceed as follows:—

Evaporate the remaining portion of the filtrate to dryness. Dissolve a small portion of the residue in a drop or two of water to saturation; to this saturated solution add a drop or two of carbazotic acid; if potassa is present, there will be formed a crystalline yellow deposit or precipitate, which is not the case if soda or lithia be the base of the salt dissolved.

A few drops of a solution of bichloride of antimoniate of potassa will produce a crystalline precipitate in a solution of a soda salt.

If there is no soda present, take a little of the powder obtained as residue by evaporation, and heat it on a platinum loop in the inner blow-pipe flame; a beautiful crimson tinge in the outer flame distinctly points to the presence of a salt of lithia; whereas, if lithia be present, potassa will tinge the flame violet. On the contrary, if soda be present, the outer flame will be a rich yellow, although both potassa and lithia were likewise present.

This brief description of the mode of analyzing collodion will assist the operator in finding out the nature of the contents of his collodion, without regarding their respective quantities, and, in this respect, it is useful and reliable.

ARTISTIC COPYRIGHT.

A CASE of considerable importance to artists and the purchasers of their works was last week decided by the Vice-Chancellor Sir Page Wood. The facts were, that Mr. C. Lucy, having painted a picture called the "Children in the Wood," the proprietor of the *Illustrated London News* acquired the copyright in that picture, and published a chromo-lithographic print therefrom as part of the Christmas number of that paper upon the 23rd of December last. The copyright in the *painting* was afterwards duly *registered* by the proprietor of such copyright at Stationers' Hall, pursuant to the requirements of the "Copyright Works of Art Act, 1862." Towards the end of March the managers of the *Illustrated London News* found that pirated copies of the *design* of the painting in question had been extensively sold in London. Inquiries were thereupon instituted, and it was ascertained that Messrs. Geck and Moir, importers of and wholesale dealers in foreign prints and engravings, had imported and sold numbers of the copies, which were an infringement of the copyright as registered.

A Bill in Chancery was thereupon filed by the proprietor of the *Illustrated London News* against Messrs. Geck and Moir, whereby, amongst other things, the plaintiff prayed that the defendants might be restrained from selling any copies or colourable imitations of the plaintiff's painting. Counsel thereupon moved for an injunction accordingly. On behalf of the defendants it was stated that, upon the suit being instituted, they had sent back all the pirated copies in their possession to the person in Germany from whom they received them. But the Vice-Chancellor was of opinion that the plaintiff was entitled to have such copies returned and delivered up to be cancelled. His Honour also decreed a perpetual injunction against the defendants according to the prayer of the plaintiff's bill; and directed an account to be taken of all the pirated copies sold by the defendants, and of the profits made by them, and that they should pay such profits to the plaintiff. The Vice-Chancellor also directed an account to be taken of the pirated copies in the possession or power of the defendants, and that the defendants should deliver up such copies to the plaintiff to be cancelled. And lastly, that the defendants should pay the *costs* of the suit.

As far as we are aware, this is the first case which has come before either of the superior courts under the Act of 1862, which, for the first time, created copyright in "every *original* painting, drawing, and photograph which shall be or shall have been made, either in the British dominions or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act," that is, the 29th of July, 1862. It gives the author of such an original work, being a British subject, or resident within the dominions of the Crown, and the assigns of such author, "the sole and exclusive *right* of copying, engraving, reproducing, and multiplying such painting or drawing and the *design* thereof, or of such photograph and the negative thereof, *by any means*, and of any size, for the term of the natural life of such author, and seven years after his death." But the Act provides for the registration of every copyright so acquired, and expressly enacts that "no proprietor of any such copyright shall be entitled to the benefit of the Act until such registration; and no action shall be sustainable, nor any penalty be recoverable in respect of anything done *before* registration." Thence the importance of every proprietor of the copyright in an "*original* painting, drawing or photograph," losing no time in registering such copyright as soon as possible after the completion of the work in respect of which such right is claimed. In the case to which we have called attention, by registering the copyright under the above Act it will be seen that the proprietor of the *Illustrated London News* has been enabled to obtain protection against the infringement of his *property* quite irrespective of our disgracefully confused and inefficient Engraving Copyright Acts.—*Athenæum.*

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Correspondence.

INTENSIFYING WITH MERCURY, ETC.

Dear Sir,—With your permission I will supplement your article, "Intensifying by means of Mercury," by a few remarks:—

1. As far as my experience goes, I never knew a negative intensified with gold and mercury change in colour, or alter in density, by exposure to light. Black films I should decidedly object to, as tending to hardness.

2. It may be well to state, that in the case of a very thin or weak but fully exposed negative, the mercury and gold intensifier (which in this exceptional case would probably not give sufficient vigour), may, after washing, be followed for a second or two by a weak solution (one grain to the ounce of water) of iodide of potassium, and this again by a few drops of a thirty-grain solution of silver in iron—iron, five grains; citric acid, ten grains; water, one ounce—which rapidly produces the desired amount of density, and gives brilliancy to the high lights. A very weak negative may thus be intensified in a wonderfully short space of time; nor is this latter process complicated, for, with the several solutions mixed to hand, nothing can be more simple, though doubtless, as in all delicate photographic processes, great judgment is required. With a negative of moderate density, the gold and mercury intensifier will alone be amply sufficient.

Referring briefly to my intensifying experiences, I may state that for some time I used mercury, followed by dilute liquid ammonia, and the fine brown negatives thus obtained I never found to change in any appreciable degree after varnishing; that, however, lightens the colour of the film, and alters the printing qualities of the negative. I next tried, with success, Mr. Lacy's process, and by it got some negatives that yielded excellent results; but the great and fatal objection to it is that, as is well known, most of these green negatives become hard and chalky by exposure to the light. A modification of this process, however, gave me negatives of great softness and delicacy, and which did not, I believe, change at all in the light. Over the fixed and washed negative a strong solution of mercury—prepared as already described—was poured, and washed off instantly; this was followed by the iodide of potassium solution, which was also removed at once; and the plate was finally treated with silver in the weak iron solution.

The gold and mercury intensifier has for some years superseded, with me, every other mode of giving to my negatives the needful printing power; and I have found it excel all other means in simplicity and certainty. I by no means wish to assert dogmatically that it is the best intensifier; but merely that in my hands, and in one other noteworthy case at least, it has proved most valuable.

I take this opportunity of saying a few words about the much-abused studio with a sloping top-light, which is so strongly anathematized in your last by "One who has paid for Experience." It so happened, that a few years ago I had occasion to enlarge a ridge-roof studio. The glass portion, or studio proper, was altered to the shape of a sloping-roofed glass-house to be found in one of your Year-Books. The roof had double blinds, white and blue, and the sides had hanging blinds, and were frosted besides. The result was so completely satisfactory, and the negatives produced in the studio, almost instantaneously, were so soft, round, and delicate, that I was sorry to exchange that studio for another; and a clever photographer, who succeeded me, was quite in love with the glass-house, as far as the light and the negatives obtained there were concerned. This is one instance, at any rate, on the other side, and I give it for what it is worth. I cannot but think, indeed, that your correspondent's difficulties arose from other causes than the mere form of his studio, which, to my mind, is neither "fanciful" nor "theoretical," if the word theoretical be used to signify something that is opposed to what is practical.—I am, dear Sir, yours obediently,

C. T. Winter.

Newliston House, Barnstaple, May 1st, 1866.

[Regarding the intensifier, as we have before said, Mr. Winter's specimens fully bear out all that he states as to the excellence and delicacy of the result; and that, in skilled hands, nothing better can be required. As to the studio question, it is probable that the case cited was one in which the room was large enough to admit of such a use of blinds as practically altered the light into a high side-light, like that of Mr. Williams, which we have mentioned. —Ed.]

NOTES ON GLASS-ROOMS, ETC.

Sir,—As you mentioned my name in your leading article last week, as having recently built and subsequently altered a glass-room with front-light, perhaps I may be allowed to add a few further remarks.

It is my opinion that, without any exception, the most grievous blunder ever committed amongst photographers was the publication and public recommendation of rooms with a sloping front-light. Within my own personal knowledge, at least a dozen have had to be altered, often at great expense, in more than one instance at ruinous cost.

The pictures produced are the worst possible results of photography, and the light is always slow, and yet almost blinding to the sitter.

Two years ago, on building a new studio, I was deluded into building in that form, and had, after six months' trial, and every conceivable form of blind, to spend over

£50 in altering the roof. I also lowered the roof 4·6, making it 8·6 at the top. It is now an ordinary ridge-roof, with a dominant north side-light six feet high. The dark portion at the end is preserved, and is very valuable; no intimidating effect can be produced on ordinary mortals, and great vigour is given to the picture. I can take negatives in about five seconds with the ridge roof, where forty seconds would have been necessary with the front-light; but the prominent improvement is in the lighting. We now get beautiful round effects in place of flat patchy black and white, and although the time of exposure is so much shorter, no glare of any kind is experienced by the sitter. I can always detect the negatives, sent to me to enlarge, which have been taken in a sloping front room—they are all alike, and prove the error in principle. I do sincerely trust that the publicity which has been given to the views of Mr. Robinson on the subject may be the means of preventing any one else from throwing away money and losing credit by this miserable blunder. Let a room have a ridge-roof and larger panes of glass, a dominant side—north or N.E.—light, and the other side built quite dark, and you will scarcely require any blinds. A few screens, light and dark, for occasional use, are all I have, with just such furniture as ordinary reasonable beings have in well-furnished dwelling-houses—no composition pianos or articles forming a score of absurd impossible incongruities. I cannot think why photographers will buy these hideous things, and give as much money for them as a handsome piece of oak furniture would cost. In a few months they warp and crack, and become seedy; then somebody tumbles over one, or the wind blows it down, and it is fit for the dust-bin.—Yours truly, Samuel Fry.

Sir,—I am very pleased to see that there is a chance of the vexed question as to the most generally useful form of studio being well discussed in your pages. For my part, I firmly believe that the ridge-roof and lean-to forms are far superior to the tunnel and sloping front-light system; and I know several instances where the latter form has given the greatest dissatisfaction and annoyance. One of my friends became afflicted with the tunnel mania, some time ago, and went to great expense in erecting a new studio of this kind. I called upon him one very fine day, and found him in the greatest despair, and, indeed, compelled to give up taking some kinds of pictures, subjects not being able to stand the lengthened exposures required to get a passable negative. His chemicals were in perfect condition, and his lenses of the very best kind, and I feel certain that his failures were simply owing to this particular form of glass-house. On the very same day, I was getting good negatives in my own studio (a *lean-to* form) with short exposures, notwithstanding my room being much hemmed in by buildings. I know several other photographers who bitterly repent having built the tunnel-form studio.

Your correspondent, "One who has paid for Experience," complains of the gloomy effect of the tunnel, and I certainly agree with him that it is not the most agreeable shape. I maintain, that the more we can make our studios like ordinary rooms, the more pleasant and comfortable will our sitters feel, and more truthful portraits obtained, as a matter of course. The only advantage of the tunnel is in focussing; but the plan I adopt is to have a light frame, running on good castors, and covered with black twill or calico; this shields the camera from too much light, and enables one to focus comfortably without a cloth over the head. It can also be easily pushed from one part of the room to another.

In conclusion, I think if country photographers would take the advice of gentlemen like Mr. Robinson, Mr. Hughes, and others, who have really *exhibited* first-class pictures taken in studios such as they describe, we shall have fewer complaints about glass-house difficulties.—I am, Sir, yours very truly, A Country Photographer.

Cheltenham, May 1st, 1866.

Photographic Notes and Queries.

F. W. Hart's Economic Filter.

Sir,—With your permission, I beg, whilst thanking your correspondent, Mr. Baynham Jones, to add one or two remarks to the description given of a few of the many uses to which my new Economic Filtering combination is applicable, which will show that his suggestion is practically anticipated in the apparatus.

The arrangement to which the gentleman points in the engraving is for pharmaceutical purposes, such as making etherial and alcoholic tinctures by percolation. Of the two tubes, one is for the discharge of the filtered spirituous compound, and the other to convey back to the percolator (P) the displaced spirituous vapour from the receiver (R); thus the process goes on without contact with the air. Perhaps a more familiar illustration to your readers will be the filtration of collodion, where it is imperative that the product should be filtered in its own vapour, so as to prevent its micturing from loss of spirit.

I shall be happy to show Mr. Jones, or any other gentleman, that the nitrate of silver solution (negative) can be *filtered into a plain simple dipping-bath, and emptied again, by the apparatus, without the intervention of any other vessel or appliance, and without the loss of a drop.*—I am, sir, yours truly,

F. W. Hart.

52, Canterbury Road, near Kingsland Gate, London, N.
May 1st, 1866.

Talk in the Studio.

Grisdale's Improved Washing Machine.—We described, some time ago, a very ingenious washing machine, just patented by Mr. Grisdale, in which the aid of centrifugal machinery was made available to secure a very efficient system of washing prints, and driving out, as far as possible, the ultimate traces of hyposulphite of soda. A few days ago, on the invitation of Colonel Stuart Wortley, we had an opportunity of seeing one of these prints in action, and, from an inspection of the practical working, we were more than confirmed in our favourable view of the principle involved. Without entering into minute details of description, which were given in our last volume, we may mention that the prints are placed round a drum upon a reticulated canvas of very open texture, between the successive folds of which the prints are held, a few score or a few hundred prints being equally easily dealt with. This drum revolves rapidly in a covered trough, and the water, entering from a supply pipe in the interior of the drum, is driven by the action of centrifugal force through the layers of prints and folds of canvas, so as to find its escape by the outer surface of the drum. It will be seen that the water must not simply soak the prints—a process so common and so injurious in many washing machines—but it must pass right through them, with great force, in an infinity of small streams, permeating every pore of the paper with a fresh supply of clean water. A more effectual elimination of hypo. will be thus effected than by a week's soaking in even running water without the absolute change, by draining at frequent intervals, of all the water in and clinging about the print. By allowing the water to accumulate in the trough, and revolving the trough slowly, an effectual soaking for the early part of the washing can be secured. The United Association of Photography have, we understand, undertaken the manufacture and sale of this washing machine.

Art and Photography.—At a recent annual festival of the Artists' Benevolent Fund, the Chairman, Lord Henry Lennox, in the course of an excellent speech, made some remarks, the purpose of which we do not quite understand. He said: "Art had many obstacles to contend with. One of its obstacles was to be found in the science of photography. A copy of an engraving formerly sold at so many guineas could now be purchased in the photographic shops at as many shillings. Whether this system was a just one towards artists it was not for him to say; but this much he could and he would say, that the question was one that ought to occupy the serious attention of the Government of the country. On looking over the list of subscribers to the fund, he found that out of the 300, 79 were engravers. Whether the system which enabled the public to purchase for their sixpence and their shilling pictures which used to sell for so far larger prices, was a good one or not, it at all events was a question which merited attention." Is it simply to piracies Lord Henry refers? Or does he contemplate a Government prohibition of photography on behalf of art?

The "Photographer's Assistant."—We have pleasure in calling the attention of our readers to an announcement in our advertising columns, from which it will be seen that our able contributor, Mr. W. T. Bovey, better known as the "Photographer's Assistant," has opened an establishment in London, for printing, which will, we hope, be as successful as its principal is deserving.

Camera for Children.—Col. Stuart Wortley called our attention, the other day, to a camera with a "finder." The principle is not new; but here it was very conveniently and usefully applied, and afforded facility, when the sensitive plate was *in situ*, for focussing by means of the lens used as finder, and watching for the moment of quietness or of satisfactory expression, and then, without the slightest motion which could disturb the attention of a child or an animal, uncovering the lenses by means of a spring shutter inside the camera. The arrangement, it will readily be seen, possesses many advantages for the portraiture of children, and would often be useful with adult sitters. In this camera there were three lenses; two for a pair of portraits, and one to act as finder.

The Photographic Society.—At the next meeting of the Photographic Society, to be held on Tuesday evening next, a paper on the "Angle of Vision" will be read by Mr. Allen, and a new patented washing apparatus, by Mr. Grisdale, in which the water is driven through the prints by centrifrugal force, will be exhibited.

Soiree of the Photographic Society.—It is contemplated at present to hold the Soirée of the Photographic Society in the large hall of King's College, on the evening of Thursday, the 7th of June.

Gustave Dore's Illustrations.—Some of the finest studies in composition and light and shade, so important to photographers, as well as the most noble examples of fresh and original thought and artistic power, are to be found in the illustrations of Gustavo Dore, issued by Messrs. Petter and Galpin in connection with various works. The Illustrated Bible, now issuing in parts, will be the finest thing of the kind ever published.

Sarony's Posing Apparatus.—We are glad to learn, from various sources, that the favourable estimate we formed of this "rest" is fully borne out by the practical experience of portraitists. All who have used it convey to us the assurance of its practical excellence in facilitating their own operations, and affording ease and securing grace in the sitter. Mr. Beattie, of Clifton, one of the oldest photographers and most able of provincial portraitists, writes to the effect, that having often desired to secure some such aid, and failed in his own efforts, he heard of this at first with much prejudice. After a trial, however, he came to the conclusion that its value to the portraitist could not be overestimated in securing "the sense of ease and comfort so necessary to a fine likeness. There is no expenditure of effort on the part of the individual, whatever the position may be, they feel at ease at once, and must, therefore, look so." In France, where it has just been introduced, we understand it was appreciated immediately, and ordered at once by the majority of the best portraitists.

Mr. Mudd's Collodio-Albumen Process.—We have pleasure in announcing that Mr. Mudd has a little work in the press, in which he gives the fullest working details of the collodio-albumen process, as employed by himself, in producing the charming pictures with which photographers are familiar. Some other original articles, and some of the author's contributions to the journals and societies, will be given in the same work, which will be looked for with interest by photographers.

To Correspondents.

R. M.—An ordinary quarter-plate portrait lens will rarely answer well for standing figures in card pictures, for two reasons; it is, in the first place, generally of too short a focus to cover properly, and in the next place, it is not made with a special view to the flatness of field required. A good half-plate lens will answer very well under certain circumstances. It is, however, generally, somewhat longer in focus than is needed, and renders necessary a long studio; and the required space between the sitter and the lens being thereby increased, the picture in foggy weather, or when, from unavoidable causes, a mass of illuminated atmosphere fills this space, is often wanting in brilliancy. A good card lens will generally answer for most other purposes up to the size it will cover; but ordinary portrait lenses are not always good card lenses, the perfect definition of a standing figure, the necessity of rapid action, &c., all demanding especial characteristics in the lens.

Builder (Canada).—We have not much personal familiarity with No. 1, but the accounts we have heard are not very favourable; No. 3 stands highest. 2. Yes. 3. No. 4 pretty good; but somewhat belonging to the past. 4. Much depends on the work you intend to do. In a portrait establishment we should prefer working up to 12 by 10 direct, and using enlargements for life-size pictures. So far as we know, Monckhoven's enlarging camera is the best. 5. The photo-relief process is quite in a practical condition now for large numbers. 6. Mr. Robinson paints his own backgrounds for his own pictures. We cannot tell you where you can get any like them. 7. His printing frame for opal glass is manufactured by Meagher. It answers admirably. We have made enquiries about the Dublin awards for Canada, but have not yet received an answer. So far as we can judge, the studio will answer well.

John White.—Thanks for the photographs of your head-rest. So far as we can judge by a picture, it appears to possess some advantages over the common head-rest in general use; but it is of course impossible to give a satisfactory opinion from the mere examination of a diagram of the apparatus.

G. W. D.—The article to which you refer was, as stated, an extract from the *Scientific American*, describing a process patented in the United States, and contained all the definite information we possess on the subject. But it is probable that the following proportions would answer:—One ounce of gelatine and 15 grains of bichromate of ammonia in 6 or 8 ounces of water. We shall be glad to hear your suggestion regarding the matter.

J. Weston.—Mr. Robinson's paper on the "Glass-Room and its Contents" appeared in the News for February 16th of this year. 2. The mode in which you make your bath is perfectly right; but the quantity is too small for any practical purpose; eight ounces of bath solution will be very rapidly exhausted and put out of order. It is probable that leaving a collodion plate in all night may tend to over-iodize such a small quantity. You will find it absolutely more economical and comfortable to use a bath containing at least from a pint to a quart of solution. The stains of metallic silver round the edges of your plates more probably arise from contact of the silver solution on the plate with the frame of the dark slide, which is probably not perfectly clean; this will cause reduction of metallic silver wherever such contact occurs, and where the drainings which have so been in contact flow.

J. H. W.—We have noticed in Selle's intensifier the tendency to form a slight precipitate; but have not found the solution work any worse when that tendency was present. In any case, the two solutions, the ferrocyanide and the persulphate of uranium solution, keep perfectly separately, and the mixture might easily be made when required.

J. P. C.—The acetate bath is most suited for producing warm purple-brown tones. For black tones we prefer the lime bath; one grain of chloride of gold and one grain of chloride of lime in five or six ounces of water, kept a day or two before use, will usually give fine black tones. It may be made to use without keeping more than a few hours, by employing hot water to make it with. In general form, it is probable your glass-room will answer; but you have too little glass. We should prefer the dark portion shorter by three or four feet, and that amount of glass additional added to sides and roof of studio portion. That portion would be better three feet higher. Do not put any glass in the portion in front marked A. The east side should be glazed in preference to the west.

Kent.—Thanks. We shall preserve a record of your offer of £5 to the Benevolent Fund, and let you know when any organization is formed.

C. H. F. (Hull).—Thanks. We shall have pleasure in publishing particulars when you let us have them. We should think any of the makers of apparatus, whose names you will find in our advertising columns, would undertake the matter, and possibly make some arrangements with you to reimburse you for aid in making and selling the apparatus required.

B. L. P.—Newly sensitized collodion generally gives less intense pictures than a sample which has been iodized a few weeks, and is at times disposed to fog. The addition of just sufficient tincture of iodine to make the collodion of a sherry colour will generally prevent fogging, and will not, in the case of bromo-iodized collodion, appreciably interfere with sensitiveness. For a dry process, see first article in present number.

J. P. Edwards.—Thanks. The matter shall have due attention.

New Toy.—You will find full details of the magic photographs in a paragraph in "Talk in the Studio," last week, and also in Dr. Vogel's letter in the same number. The prints are ordinary silver prints on albumenized paper, fixed, but not toned. The image is then bleached by means of bichloride of mercury, until it disappears. The blotting-paper has been previously saturated with hypo, and when moistened and brought into contact with the print, converts the image into sulphide of mercury.

Photo Juvenis.—The addition of excess of gold would produce rapid toning, and that has probably produced over-toning. Rapidly toned prints are more apt to be reduced in the hypo than slowly toned prints. But remember that the kind of reduction you describe is more frequently due to a weak negative than to anything else.

An article, "Further Remarks on Front Light and Tunnels," is compelled to stand over until our next, as are one or two letters on the same subject, and other articles in type.

Several Correspondents in our next.

Photographs Registered.

Messrs. Brown and Wheeler, Cowes, Isle of Wight,
Photograph of Group of their Serene Highnesses the Prince and Princess Hohenlohe, and the Princess Leinengon.
Photograph of Group of Her Serene Highness the Princess Hohealohe, Prince Ernest, and Princess Elise.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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A DRY PLATE TOURNAMENT.

There are few things which interest an Englishman more than a race or a match of any kind. A competitive trial of the skill of men, the speed and endurance of horses, the pluck of dogs, or the varied merits of a score of other things, will always secure the most eager attention. Amongst photographers the comparative advantages of a series of processes possess a similar interest, and a competitive test applied by a number of competent men is a circumstance which could not fail to arouse the most lively excitement in all concerned. When, therefore, a week or two ago, we received from Mr. Russell Manners Gordon, whose search after a dry process we described last week, an invitation to be present at a dry plate tournament to which he had invited some of the ablest dry plate photographers in the metropolis, aiming to secure a number of representative men, so that varied processes should be tested, each worked by one who was master of its details, we gladly accepted the invitation to be present, and assist in timing the exposures, &c.

Saturday, the 5th, had been fixed upon as the day, the exposures to commence at eleven o'clock. As day after day during the week opened with fog, or rain, or dull sky, we, in common with all concerned, watched the weather with anxious interest and some gloomy forebodings. At length Saturday came, bright, sunny, and clear, with only one drawback; this consisted in the driving clouds which, at rapid intervals, obscured the sun; but as they were rarely dense, and always white and bright, they practically interfered very slightly with the uniformity of the light during the whole period which was required for completing the exposures.

A brief record of the results will form a useful and interesting addendum to the "Search" described in our last. The processes which were entered in the lists were collodio-albumen with and without alkaline development; Fothergill proper; Fothergill with Mr. Hannaford's modification; the same with Mr. Ackland's modification; tannin with alkaline development; Hill Norris's ordinary plates; resinized collodion excited in a morphine bath; the same treated with gelatine; and the process described in our last as having been worked out by Mr. Gordon. Each plate was prepared with care expressly for this trial. Each was exposed in the same camera, with the same lens and stop, on the same subject, and with nearly the same condition of light. Each competitor was allowed to determine the time of exposure required for his own process; and each developed his own plates in his own way. It is noteworthy and interesting to observe, at the outset, that notwithstanding the difficulties and uncertainty supposed by some to exist in dry plate photography, there was no absolute failure in any of the plates exposed. There were degrees of excellence in the result, and there were great differences in exposure, but no plate failed to produce a picture, and all comparatively free from defects.

The exposures commenced soon after eleven o'clock, and were completed in rapid succession in little more than an hour. The subject chosen was that described last week, with a sunlit white house, and ivy-covered wall in shadow; there was also a tree in the foreground, the dark bark of which, where it was in shadow, was a very severe test for the rendering of weak and non-actinic radiations. The lens was Dallmeyer's wide angle single lens, with No. 2 stop.* As a starting-point, it was ascertained by trial that under all the same conditions, five-and-twenty seconds were required for a wet plate with everything in good condition. The proceedings then commenced as follows.† We will give the exposures first, in the order in which they were made, and afterwards describe the development and results.

Exposures.

No. 1. Tannin (for alkaline development) ... 3 minutes.
Of these 3 minutes, a little more than 2 minutes were in bright sunlight, and the remainder diffused light with white clouds.
No. 2. Hill Norris, ordinary ... 3 minutes
Same sun and shade as above.
No. 3. Fothergill, Hannaford ... 2 minutes.
Chiefly sunlight.
No. 4. Fothergill proper ... 2 minutes.
Chiefly sunlight.
No. 5. Resin, morphine, and gelatine ... 3 minutes.
Of this time, 2½ minutes were sunlight, and the remainder diffused light.
No. 6. Resin and morphine ... 3 minutes.
Same light as last.
No. 7. Fothergill, Gordon's modification ... 1′ and 40″.
Chiefly sunlight.
No. 8. Collodio-albumen ... 10 minutes.
Chiefly diffused light.
No. 9. Collodio-albumen ... 3 minutes.
Similar light.
No. 10. Collodio-albumen, by another hand ... 10 minutes.
Diffused light.
No. 11. Fothergill, Ackland's modification ... 10 minutes.
Diffused light.

As we have said, the sunlight was at times interrupted for a few seconds by white fleecy clouds, which did not, however, interfere much with the quality and uniformity of the light, except for the last three or four long exposures, in which there was a clear diffused light, with but little sun.

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* The focus of this lens is 7 inches; the diameter of the stop 3·8, or a little more than one-third of an inch.

† For obvious reasons, in a case of this kind, we give the process competing rather than the person, and forbear the mention of names, simply assuring our readers that each gentleman was a master of his own process.

Development, &c.

The development proceeded in the same order as the exposures. In describing the behaviour of the plates in this process, we may as well also briefly mention their preparation.

No. 1. Tannin.—This plate was prepared with a bromo-iodized collodion, containing 1¼ grains of bromide of cadmium, 4 grains of iodides, of which three-fourths were cadmium and one-fourth ammonium. No preliminary coating of the plate, but the edge varnished when the plate was finished drying. A 35-grain nitrate bath, with a trace of nitric acid, well washed, and coated with a 12-grain tannin solution, and dried. In development, after moistening the film, a 1½-grain pyro solution, with one or two drops of a 20-grain solution of carbonate of soda added, was applied to the film, and continued until a very definite but thin image was brought out; after which it was washed and treated with acid pyro and silver, the latter added slowly and cautiously, until sufficient intensity was obtained. The development of this plate required half an hour. The result was on the whole good, but there was a trace of under-exposure, and also a little flatness from the necessity of piling up in development. A slight tendency to loosening of the film was present, but this was remedied by skilful management.

No. 2. Hill Norris.—This plate was clean and of good quality, but, after long development in the usual way, gave unmistakable indication of under-exposure.

No. 3. Fothergill, Hannaford's formulæ.—Bromo-iodized collodion; 30-grain neutral nitrate bath; washing in two dishes of distilled water, and then free washing in common water, and rinsed in distilled water. Coated with albumen prepared with the white of one egg and two ounces of water; 1 grain of nitrate of silver in a drachm of distilled water, and 5 drops of strong ammonia being added to each ounce of albumen solution. This preparation is then washed off, and the plate is dried. The development was commenced with a solution of plain pyro, which was continued until all detail was fully out. It was then cautiously and slowly intensified with acid pyro and silver. The negative, when completed, was full of detail, but considerably over-exposed; it would have been better if exposed a minute and a half instead of two minutes.

No. 4. Fothergill proper.—The same collodion, nitrate bath, &c., as above. The coated plate washed in a dipping-bath of distilled water, moving it up and down for a minute; coated with the same albumen as above, minus the silver, and then washed. Developed slowly with acid pyro and silver. Considerably under-exposed.

No. 5. Resin, Morphine, and Gelatine.—This plate was prepared with a collodion containing equal proportions of bromide and iodide, to each ounce of which 1 grain of gum guaiacum was added; excited in an old nitrate bath, to ounces of which pure morphia had been added. The plate, after exciting and well washing, received a wash of a 3-grain gelatine solution, and was finally washed in distilled water, developed with plain pyro, and intensified with acid pyro and silver. The development very slow, and a trace of under-exposure manifest, but the resulting negative of fine delicate quality.

No. 6. Resin and Morphine.—The same in all respects of preparation and development as the above, minus the wash of gelatine. More under-exposed, and not so clean or delicate.

No. 7. Fothergill, Gordon's formulæ.—This plate was prepared and developed as we described last week. It developed rapidly, exquisitely delicate and full of detail. The exposure, which was calculated as four times as long as the wet process required, was found to be too long; the negative would have been better for an exposure of 1½ minute, or three times as long as the wet.

No. 8. Collodio-albumen.—This plate was prepared as nearly as possible after Mudd's formula. The development was commenced with plain pyro and finished with acid pyro and silver. The development required 20 minutes, and the resulting negative was a very excellent one.

No. 9. Collodio-albumen.—This plate was prepared the same as the above, but only exposed 3 minutes instead of 10 minutes. The development was commenced with a solution containing 1 grain of pyrogallic acid, and 1 grain of carbonate of ammonia, upon application of which the image flashed out at once; but there were traces of fog. It was at once washed and treated with a solution of citric acid, and then intensified with acid pyro and silver in the usual manner. By piling up the deposit, a printing negative was obtained, notwithstanding the fog, which did not proceed further after the application of the citric acid. If a much smaller proportion of ammonia had been used in conjunction with the pyro in the first instance, it is probable that an excellent negative would have been obtained.

No. 10. Collodio-albumen.—This plate was prepared by another hand, but nearly in conformity with Mudd's formula. The development was commenced and continued with acid pyro and silver in the old manner, using, however, the smallest possible trace of silver to commence with. The result was a very good negative.

No. 11. Fothergill, Ackland's modification.—This plate was prepared in conformity with Mr. Ackland's modifications of the Bartholomew-Hannaford-Fothergill process, the only deviation from his formula being that double the proportion of albumen, nitrate of silver, and acetic acid were used in the preservative. It was developed with acid pyro and silver from the commencement, and yielded a very good negative.

Summary.—It will be seen that the issue of this comparative trial strongly bears out the conclusions in the article in our last on the "Search after a Dry Process." In point of sensitiveness, the plates prepared on the principle involved in the Bartholomew modification of the Fothergill process were the quickest. That prepared by Mr. Gordon's formula was out of all proportion the most rapid; it was the most easily developed, the most delicate in detail, and had no trace of fog, no tendency to leave the film, nor, indeed, any trouble of any kind. Next in sensitiveness was a plate (No. 3) prepared on the same principle, but with slightly different formula. In this the negative was full of detail; but being over-developed as well as over-exposed, it is probable that it would not print with great brilliancy. Taking a third place in point of sensitiveness, several plates were tolerably equal. The morphine plates, the collodio-albumen with alkaline development, and the tannin with alkaline development, all received 3 minutes' exposure. The morphine plate, which had also been treated with gelatine, produced the most delicate negative, but was a trace under-exposed. The tannin plate, very carefully and judiciously treated with alkaline development, and then slowly and carefully with minute doses of silver in acid pyro, gave a very fair negative, which would, however, have been better for a little longer exposure. The collodio-albumen plate would, it is probable, if the alkaline development had been equally cautiously applied, have given the best negative of those with the 3 minutes' exposure. The Fothergill proper was under-exposed with 2 minutes', but would probably have been about right with 3 minutes' exposure. The Hill Norris plate was so much under-exposed with 3 minutes' that it was difficult to judge of its quality or position; but it was perfectly good, so far as it went, and probably would have been right with 6 minutes' exposure. The collodio-albumen plates were all as certain and excellent as we have always known them to be. With the ordinary development they were less sensitive than some of the others, but the results were good. The plate prepared on the principle of Mr. Ackland's modification perhaps scarcely had fair play, as no attempt was made to secure a [short exposure, and it was developed with acid pyro and silver from the outset.

As a further severe trial for the Gordon modification, it was proposed, after the bright light was gone and dull afternoon had set in, with rain-clouds gathered overhead, to try a group on one of these plates. Accordingly, all the knights who had engaged in the tournament, with the Queen of Beauty in the centre, were duly grouped, with foliage for background, and a plate exposed with a 6-inch single stereo lens, largest aperture, for 20 seconds. The time seemed absurdly short, for with a wet plate 15 seconds would have been required. Nevertheless, with extreme caution and care in the development, an excellent negative was obtained, perfectly clean and free from abnormal deposit, although nearly an hour was occupied in the development, the greater part of which the plate was treated with very strong solutions of plain pyrogallic acid.

The interest and instruction of competitive experiments like these cannot for a moment be doubted, and we strongly commend them for imitation elsewhere. We have confined our pen here to the simple matter-of-fact duty of recording the details of the operations, so far as they may be instructive as well as interesting to our readers. Of the fun and enjoyment of such a gathering, of the bottles of champagne proposed as the grand prize, of the heavy odds laid on processes, and good-humoured badinage, it is not our province to write. We can, however, promise our readers that great as is the profit of such experiments, they will derive quite as much pleasure as profit in carrying out a similar tournament.

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ON THE BEHAVIOUR OF IODIDE OF SILVER IN THE LIGHT.

BY DR. W. REISSIG, FORMER ASSISTANT OF PROF. BUNSEN.

[For the following interesting article, from the *Photographische Correspondenz*, we are indebted to the courtesy of the able Editor of that journal, M. L. Schrank, Secretary of the Photographic Society of Vienna, by whom we have been favoured with an early copy.—Ed.]

The whole examination* may be divided, by retaining former conclusions in view, into three different parts:—

1st. The behaviour of pure iodide of silver in the light.

2nd. The behaviour of iodide of silver in the light when covered with pure solutions of nitrate of silver.

3rd. The behaviour of iodide of silver in the light when covered with pure solutions of ferrocyanide of potassium.

First Series of Experiments.

Pure iodide of silver.

Iodide of silver (Ag I) is formed, as is known, in two different manners:—

1st. By precipitating a solution of a salt of silver by hydro-iodic acid, or by an aqueous solution of iodine; or—

2nd. By the direct action of the two bodies on each other.

We will pay attention to both of these preparations, obtained in the different ways.

I. Iodide of silver obtained by the wet process.

The preparation of absolute pure iodide of silver is scarcely to be obtained by the union of nitrate of silver with iodide of potassium. Precipitating this compound from an excessive aqueous solution of lunar caustic, we find at once traces of Ag O adhering obstinately.

By precipitating Ag I from an excessive solution of iodide of potassium, a precipitate is produced which, though in very small quantities, contains K I, which is difficult to be removed by washing with water.

It is on these facts that is grounded the different relation of the compound prepared, in the one or the other manner, to the light. The former is called sensible, the latter insensible compound. Therefore, it seemed to be of most important interest to prepare some absolutely pure iodide.

Before all, I must still, in passing, mention that the pure preparation of nitrate of silver, and particularly of iodide of potassium, is an extremely troublesome and difficult one. The latter, almost in every case, preserves some traces of compounds of chlorine, with some of iodine of potassium, carbonate of potash, &c. The separation and reference of very minute quantities of chlorine near great quantities of iodide, succeeds, after the known methods, very hardly with security. About iodide of silver precipitated with such a compound considered as pure there are but always remaining some most important doubts upon the purity of the prepared compound, which are able to put in question the results of the whole examination.

For, by precipitating iodide of silver, this will always infallibly be mixed with chloride of silver, though in a very small quantity. But now, as well known, chloride of silver delivers, when irradiated (exposed to light), some free chlorine. If this irradiation takes place under a solution of nitrate of silver, the liberated chlorine acts just like iodine, decomposing upon the nitrate of silver, chloride of silver being produced; as well as on the contrary iodide of silver would be obtained; but both pass by taking away a part of the silver.

This fact serves as a touchstone for the question: if from iodide of silver, by exposing to light under a solution of lunar caustic, iodine became liberated? From this we observe instantly how easily illusions can take place herein; how exceedingly important, and in the mean time how difficult it is, to prepare perfectly pure iodide of silver.

Relying on the facts found by Field,* that fresh precipitated chloride of silver and bromide of silver have been decomposed by digestion with a concentrated solution of iodide of potassium in such a manner that iodide of silver was produced from them, whilst chloride or bromide of potassium are forming the solution, I have founded hereupon the preparation of pure iodide of silver, and proceeded in the following manner:—

A larger quantity of Ag I, obtained by decomposing a solution of Ag O, N O_5 with iodide of potassium, has been dissolved, by avoidance of light, in an excess of iodide of potassium, which was perfectly free from iodic acid, having been examined as to its perfect purity.

Having left it standing, it was filtered after a long while, and then, by continual stirring up, poured by drops in a *very large* quantity of purest water. The iodide of silver precipitated by these means has been most carefully washed by decantation with purest water, and then dried over chloride of calcium. All these operations have been performed in the dark. It may be still mentioned that the use of a centrifugal apparatus facilitates very much the operation of washing.

Absolute chemical pure iodide of silver, prepared in such a manner and exposed to the direct sunbeams, offers no visible alteration; but on the places where the light could act most intensely, which were coloured of a little darker yellow, by examination of the exposed compound, we shall find it act towards all means of solution and reagents perfectly like unexposed iodide of silver; consequently a chemical change did not take place. The little darker yellow colour only seems to originate from thermal influences.

It appeared interesting to me to examine the behaviour of the purest Ag I in the light, when it is exposed to the latter in very thin layers, and in the same manner as in the wet process of photography.

For that purpose I coated a glass plate with collodion, which was iodized with purest iodide of potassium. I put it in a ten per cent. solution of $AgONO^5$ (by avoidance of light), washed it, and poured over the Ag I upon the plate a solution of K I, saturated with iodide of silver. The latter I left acting at least six hours, so that, as it was argued from Field's experiments, only purest iodide of silver could exist upon the plate.

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* See Report of the Session of the R. I. Academy of Sciences, Dec., 1863.

* Journal of Practical Chemistry, 73, 404.

If this iodide of silver collodion plate is exposed in dry condition, and by a direct sunlight, under a negative a long time, and without excluding thermal actions, there are often to be seen very distinct images, represented by a little darker colour; but the chemical examination did not show any chemical change.

If, on the contrary, such a plate was exposed under a negative, in the shadow or in the diffused light, for a long time, though I did not obtain a visible image, nor marks of a chemical change, nevertheless the parts of the iodide of silver which received the stronger light appropriated especially the metallic Ag which is set free when a solution of protosulphate of iron (containing acetic acid), viz., a developer, mixed with a few drops of solution of nitrate of silver, is brought upon the plate.

This behaviour of iodide is most remarkable. It proves that purest iodide of silver, exposed to the sunbeams without experiencing any chemical decomposition, becomes able to appropriate the particles of silver from the developer, and that it is, after the common expression, sensible to light.

2.—Iodide of Silver Prepared by the Wet Process by Uniting Silver and Iodine.

Iodide of silver, which may be produced by the direct union of some minutely distributed metallic silver with iodine, did not show other behaviour than the compound prepared in the above described manner.

But there are resulting some peculiar and in part most remarkable differences by leaving iodide to act upon a collodion film that contains some minutely-divided Ag.

The preparation of such plates, which I will simply call collodion silver plates, is executed as follows:—

Some collodion, mixed with purest iodide of potassium, was put upon a plate, and the latter placed, in the usual manner, in a bath of silver; then it was exposed, with the adhering solution, a few seconds to the daylight, and a solution of protosulphate of iron (containing acetic acid) poured upon it.

After the development, the undeveloped iodide of silver upon the plate was dissolved by cyanide of potassium, and the plate was abundantly and most carefully washed.

In that way we obtain a collodion plate impregnated with minutely distributed metallic silver. As I was convinced by the analysis of the silver prepared in the same manner, it is perfectly pure, so far as there is not added too little acetic acid to the solution of iron, and that the latter was not used too saturated (2 per cent.); otherwise the silver contains some mixed traces of sulphate of iron.

Such a well-prepared collodion silver plate, being treated with a small quantity of iodized water, or (and this being the surest way) with a solution of iodide of potassium, which by injection of chlorine contains some free iodine, the existing metallic silver will not be perfectly changed in iodide of silver.

Washing off most carefully the solution of iodine, and exposing such a plate in dry condition under a negative, it will soon appear (sometimes already after twenty or thirty minutes) a visible and excellently modelled image.

By very short exposure such an image is not to be seen; but I succeeded several times in making visible the impression of light, which is not perceivable to the eye, by exposing the plate, as by the Daguerreotype process, to vapours of mercury, and developing with it.

An examination of those proceedings cannot be executed with security. The more or less strong opacity of the silver plates with collodion (of which just those yield the best results which are the most covered with Ag) does not permit us to observe the action of re-agents with security, whereby there is besides still to take into consideration the presence of metallic silver. Yet it is probable that the origin of ese images (s. f. b.) may be explained thus, that iodide of silver, when united with metallic silver, liberates, by exposure, iodine, which is received by it, whilst proto-iodide of silver, Ag_2 I, is formed.

The silver of a collodion silver plate being entirely changed by an often-employed concentrated solution of iodine, dissolved by iodide of potassium (saturated with Ag I), and the solution of iodine most carefully removed by washing off, these plates, being exposed to light a longer time, will show the same behaviour as the iodine of silver plates prepared directly by the wet process.

It is remarkable that I found in one case a separation of iodine, viz., when to the collodion of the plate was added some castor oil; and it seems, therefore, as if this oil would act like an exciter (*sensibilisator*), as it is called generally.

Second Series of Experiments.—Iodide of Silver and Solutions of Nitrate of Silver.

I have nothing new to add about the preparation of a purest nitrate of silver, it being known already. The salt I used, by the examination being free from all impurities, was obtained perfectly free from acid by recrystallizing it six times. An especial care was taken not to touch either solutions or crystals, in whatever manner, with organic matter. The touching of the crystals with the hand—an imperceptible quantity of dust—in general, the most minute impurity of organic origin—cause, on dissolving the salt in water, its partial reduction, which would be very easily attributed to other reasons.

The water I used by dissolving was obtained by distillation from a glass retort never before used. These operations have been thrice repeated, observing the means of cautiousness already known (ordered by Bunsen), as it is only in this manner we may be sure to get perfectly pure distilled water.

For the same reason its preparation is highly necessary, because, if it contained any traces of organic matters, a decomposition of the nitrate of silver by the light would be infallibly occasioned.

The solutions I obtained by uniting those purest bodies did not show at all any chemical change when exposed to the sunbeams. By the carefullest examination I could discover neither a separation of silver, which Dr. Vogel asserts to have observed, nor other change; the liquid remained clear, like water, and neutral, as it was before.

It being possible that solutions of $Ag\,O\,N\,O_5$, united with collodion, could act otherwise, I dissolved, avoiding light, the perfectly pure preparation by some absolute chemically pure alcohol until entire saturation, mixed it with the half of purest ether, and, after pouring off most carefully from the $Ag\,O\,N\,O_5$, partially precipitated by it. I put in the mixture a sufficient quantity of gun-cotton, which was perfectly free from chlorine and oxalic acid.

Several glass plates have been coated with this collodion, and then placed in a 10 per cent. solution of some purest $Ag\,O, N\,O_5$ in water. The plates taken out, I exposed them a few hours during several days to the light, avoiding the evaporation of the aqueous liquid by setting the plate in a glass case hermetically closed, and entirely filled with vapours of water. But after this I could observe neither a separation of Ag I, nor other chemical change.

Also, upon plates which were kept wet, and had been exposed a long time by means of an objective, it was impossible to produce an image when I tried to develop them, which attempt I repeated many times.

From these trials it results, that solutions of nitrate of silver do not prove at all a decomposition by exposing them. Such is only to be seen if the $Ag\,O\,N\,O_5$ be impure or alkaline (that is, containing oxide of silver in the solution), or if it has not been dissolved in absolute pure water.

Now, if chemically pure iodide of silver is covered with a layer of purest solution of $Ag\,O\,N\,O_5$, and exposed to the direct sunbeams, or for a longer time to the diffuse light, we may observe (as already often noticed) that the bright yellow colour of the iodide changes into a dark brownish one, which turns a little into greenish, produced by the yellow iodide of silver lying under it. This test being undertaken with larger quantities of iodide of silver, which, on account of facilitating the action of light upon it, have been extended in thin layers, and often distributed, and employing hereby very large quantities of liquid (that is, of solution of $Ag\,O\,N\,O_5$), it is to be seen that the mass of iodide liberates small bubbles of gas, produced by the warming through exposition to light. The liquid being neutral before, exhibits by and by an acid reaction.

Though I have employed in these experiments very large quantities of iodide of silver, and having exposed it with a solution of silver, which has been warmed and carefully sheltered from dust, for a few weeks to the daylight, yet I did not succeed in obtaining such a large quantity of gas that I could examine it quantitatively by the gasometric analysis; therefore I was obliged to confine to the qualitative proof of that gas really being oxygen.

The quantity of gas gathered in a little glass vessel was put with the latter into some warmed pure water, in which the heavier solution of silver from the vessel sank to the bottom. After repeating this operation several times, and entirely separating the silver, there was put in the vessel some pyrogallic acid and potash. It is proved by the deep brown colour, and the nearly entire absorption of the gas, that it was almost perfectly pure oxygen.

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NEW METHODS OF INTENSIFYING NEGATIVES.

BY DR. P. J. KAISER.

A CAREFUL examination of the various kinds of photographic negatives which require intensifying before they will yield good copies on paper leads us to the conclusion that each kind requires a special treatment. There are two kinds which are quite common, and easily distinguished from the others: to these my remarks will be exclusively confined. The one occurs when the exposure of the plate to light has been too short, and the other when the collodion, the silver bath, or the developer were not in proper condition. Negatives of the first kind are deficient in detail, and those of the second have not sufficient opacity. It is quite possible for a negative to belong to both kinds at the same time, and a third kind must result from this combination; but, as I shall explain hereafter, it is not necessary to give special consideration to the latter.

It appears to me that none of the methods known at present for intensifying negatives can give good results, except in the case where a negative of the second kind has been obtained. All these methods of intensifying are reduced to two, wholly distinct from each other. According to the one, the silver picture is thickened by precipitation of a silver solution, and the opacity against the optical and chemical rays is thus increased; while, according to the other method, the colour of the picture is so changed by a chemical operation, that the opacity is increased only against the chemical rays. Both methods of intensifying may therefore succeed, provided the pictures are not deficient in detail, and lack only opacity.

If, in consequence of too short an exposure of the sensitized plate, the picture does not present the desired amount of detail, neither of the two methods will be sufficient to improve it, and each will give a contrast in the picture which can only be injurious to its beauty. I have found a method of intensifying which possesses a remarkable property of causing the details to appear, when, for want of proper exposure to the light, they cannot be developed by the most energetic iron baths. As this method may serve to improve the pictures when known methods fail, I have thought it advisable to publish it.

When an iodized silvered plate, exposed, developed, washed, freed from the iodide of silver unacted upon by light, and finally washed freely in water, has furnished a negative, deficient in detail, I convert the silver picture into one of chloride of silver. The different methods which may be employed for this operation do not, however, give the same results. I have operated very successfully in the following manner:—

I first prepare a solution of chloride of copper, by dissolving metallic copper in *aqua regia*. The solution evaporated, the crystallized residue is dissolved in distilled water in the proportion of 3 per cent. I then prepare a concentrated solution of sesquichloride of iron, acidulated with hydrochloric acid. The silver picture, well washed, is first covered with the copper solution, which must be renewed until the picture has uniformly changed colour; then I pour over the plate the solution of sesquichloride of iron, which completes the conversion of the silver of the picture into chloride of silver, of which the chloride of copper had made the beginning. The picture, entirely whitened, is washed in plenty of water, because a small quantity remaining on the plate would injure the succeeding operation. The plate, when well washed, is next covered with a silver solution prepared in the following manner:—

A 10 per cent. solution of iodide of potassium in distilled water is saturated with iodide of silver, in a strong light. The readiest method of obtaining this solution consists in throwing some plates of iodide of silver, well washed, into a dish containing the solution of iodide of potassium. This iodide of silver is precipitated in a special capsule; but a complete washing of this precipitate is much more difficult than that of an iodized collodion plate.

The whitened picture is now regularly and uniformly covered with this solution, and at the moment of contact, the chloride picture is converted into a picture in iodide of silver. By this double conversion the picture has acquired much more detail, and may generally be copied with success upon paper, without any further operation than a washing in ordinary water, while the original negative would have yielded only a very crude copy.

It may, nevertheless, happen that the picture has not sufficient opacity, while the desired details have become visible. It is quite easy to correct the picture, in this particular, by one of the two methods of intensifying already given. I prefer, however, one of the means of the first method, and among them, pyrogallic acid with the addition of citric or acetic acid mixed with a few drops of an aqueous solution of nitrate of silver. The picture, rendered more or less yellow by the iodide of silver, instantly acquires a beautiful brown colour by contact with the intensifying solution, and, after some time, its density will naturally have increased, according to the duration of this contact.

When the collodion or the silver bath are fortuitously in such a condition that we can obtain only images of the second class, and that the prepared iodized silver plate has been exposed too short a time, then we obtain a negative of the third class. We can correct such a negative by submitting it consecutively to the two methods of intensifying; that is, first, to the double conversion of the silver of the picture into chloride and iodide of silver; and, secondly, to the ordinary intensifying by pyrogallic acid with citric or acetic acid, mixed with a few drops of an aqueous solution of nitrate of silver. Most defective negatives naturally belong to the third class, but we must regard and treat a negative of this class at first like a negative of the first class, and afterwards as a negative of the second class; it is for this reason that I have not introduced a third special class.

We almost always attribute to new methods and precepts properties which do not belong to them, and I fear that the same thing may occur with my new method of intensifying. To avoid any possible mistake, it seems advisable to show exactly what can be accomplished by my method, in a brief summary of the operations.

In all my experiments, I have employed such ingredients that the negatives obtained by a single development have not been too marked, being assured that all intensifying is a chimera when we seek remedy a great defect; and I have also rejected the negatives when it has appeared to me that the exposure had been excessively short. To obtain a starting point, I have submitted to my new method of intensifying every negative which would yield a copy on albumenized paper, which could be easily toned and fixed in ordinary baths, but which left something to desire as to detail and vigour. I have also rejected all fogged negatives; or, rather, I have unfogged them before intensifying them. This operation may be easily performed with the aqueous solution of chloride of copper, 3 per cent., and a weak solution of hyposulphite of soda. I operate in the following manner:—

The fogged negative is carefully washed in rain-water, and the water is afterwards replaced by the copper solution. Only the quantity exactly required to cover the plate is employed. When the negative is not strongly fogged, it is left in the solution of chloride only a few seconds, and then washed freely in rain-water. A thin film of the picture is now converted into chloride of silver, and it is very curious that the precipitate forming the veil is much more strongly attacked than the picture. Therefore, the picture treated by an aqueous solution of soda will lose less opacity than the fog, and be improved. If the fog does not entirely disappear, the operation is repeated until the desired result is obtained. The picture will then be ready for intensifying by the two methods indicated.

In concluding this article, I shall recapitulate how the two methods of intensifying are applied to defective negatives.

1. Observe the quality of the negative. It may be too weak, or deficient in detail, or have both the defects above-mentioned at once.

2. No matter what defects there are in the negative, wash it, after development and removal of the iodide of silver not acted upon by light, in abundance of rain-water.

3. If the picture is too weak, apply the ordinary intensifying solution of pyrogallic acid, &c.

4. When the picture is deficient in detail, apply, firstly, the aqueous solution of chloride of copper, at 3 per cent. Wash, and replace the water by a concentrated solution of acid sesquichloride of iron. Wash again, and cover the negative with the solution of iodide of potassium in water, which is saturated with pure iodide of silver. Lastly, wash.

5. When the negative is defective in both respects, follow, firstly, the prescription No. 1; and, secondly, after washing with water, the prescription No. 3.

FOREGROUNDS, AND THEIR VALUE IN LANDSCAPE PHOTOGRAPHY.

BY EDWARD DUNMORE.*

The paper I purpose reading to you this evening is upon the subject of foregrounds, and their value in landscape photography. I do not pretend to start any theory of my own, or to proffer instruction to those who know much more of art matters than I do myself. All that I shall attempt will be to call attention to a few well-known and admitted truths, which, from their very familiarity, are frequently overlooked, and their importance underrated. It is remarkable, but not the less a fact, that many well-known rules connected with photography and other arts, and coming continually under our notice, are as continually neglected, or do not receive the amount of consideration they deserve. How often do we hear the remark—"We are so used to it, we do not notice it!" For this very reason, then, my paper will treat of those matters that, although well-known, frequently do not receive the consideration they merit at those times when they are more especially needed; but, having been overlooked until too late for the application of a proper remedy, prove a matter of after regret and annoyance.

The most important part of almost every photographic out-door subject is undoubtedly the foreground, or that portion of the picture removed but a short distance from the camera. This is the case, be the subject represented either still life or animated nature. The position the foreground holds forces it into such prominence that, if not duly cared for, it stamps the picture as bad and inartistic. Not alone in photography, but in pictures of nearly all kinds, the foreground plays an important part in the composition of the subject, and it will make or mar an otherwise unexceptionable production. In photography, I may venture to assert, that it is next to impossible to produce an artistic work without the most scrupulous attention to this portion of the subject. As a rule, the difficulty of obtaining a good and suitable foreground is not nearly so great as at first sight we might suppose it to be, if we take into consideration that the objects are to be delineated as they are seen, without addition or alteration, and not, as in painting, at the will and discretion of the artist. We may, however, make occasional exceptions to this rule by the introduction of figures, or by altering and arranging objects that may be suitable or movable near the spot. These, however, are exceptional cases; for in the majority of instances we must take things as we find them *in situ*, and trust to some favourable disposition of the light and shade to overcome the difficulty, and give us the effect we seek.

In composing an effective foreground, we must always think of the colours of the landscape as they will be when reduced to monochrome, since they give value to the composition as effectually as the form of the objects to be depicted. This rendering of the beautiful and brilliant colours of nature—not as we see them, but literally into black and white—is the greatest objection to photography; but by judicious management and selection of subject we may avoid making it a serious drawback, so far as the production of pleasing and artistic work is concerned. In adverting to the light and shade, we notice that the nearer objects are to the eye the more brilliantly are they lighted, most intense the shades, and deepest the shadows; which, as they increase in distance from the observer, decrease in power, till in the far distance they amalgamate with the sky. This applies to all colours and all objects. White forms the only exception of this lessening of power—a fact observed by many of the old masters, and alluded to by Fresnoy, in his *Art of Painting*, thus:—

> "White, when it shines with unstained lustre clear,
> May bear an object back, or bring it near:
> Aided by black, it to the front aspires;
> That aid withdrawn, it distantly retires:
> But black, unmixed, of darkest midnight hue,
> Still calls each object nearer to the view."

We photographers must especially bear this in mind, by avoiding white objects that are not intended to be the principal points of attraction. The less pure white, the more harmonious the picture; at the same time, a certain portion will be necessary to give brilliancy, and avoid a tame and insipid effect. We must remember that in photographing masses of distant foliage that have, under certain circumstances of light and atmosphere, a hazy, blue appearance, and in nature form a dark background for brilliantly-coloured and lighted objects in the foreground, will, in the photograph, have a very different effect, and fall far short of the reality. The dark and misty blue would come out much weaker, at the same time the warm yellow tints on the foreground would be more than proportionately darker; the finished print causing us to regret the inability of photography to at all approach the beauty or the truth of nature. We must, therefore, of necessity, in the practice of this art, close our eyes to the beauty of colour, *as colour*, and merely consider the result when reproduced in monochrome. Light and shade are of the *principal* importance; endeavour, therefore, to preserve breadth in the shadows, brilliancy in the lights, and harmony in all. It may be as well to make some particular portion of the foreground the principal point of attraction, and not distribute the interest equally over the whole of the picture, for that would destroy repose and injure the general effect; but from the beginning endeavour to show some decided purpose and intention, and compose the picture to illustrate some definite idea formed beforehand.

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* Read at a meeting of the North London Photographic Association, May and, 1866.

The judicious selection of a foreground is a matter of serious consideration; so, before attempting to set the camera to work, it must be well thought over, every point considered, and no object that will not harmonise with the composition allowed to be included. What is more objectionable than to see something altogether out of keeping with a subject that can be treated artistically occupying an important position? Suppose, for instance, a wild and romantic spot, every tree and stone conveying to the mind of the beholder impressions harmonising with each other, and producing that effect the artist loves to contemplate. Fancy how a piece of modern cottage or other erection, new and workmanlike, meant for use but not for beauty, would mar the effect of such a subject. It would simply disgust the artist and annoy the photographer, who could not paint it out, and, instead of making a beautiful picture, he would have to give up all thoughts of a photograph here, and select another view. I have frequently seen otherwise creditable pictures quite spoilt by some such introduction; but a knowledge of correct art will make the photographer avoid these inconsistencies. This knowledge is, moreover, indispensable, and may be either innate or acquired by observation; but unless it is obtained in one way or the other, nothing but the merest accident will cause such a photographer to make a decent picture. All who have the welfare of photography at heart must perceive that, to produce that exquisite feeling of pleasure that artists experience in looking at a thoroughly clever and harmonious composition, something besides manipulative skill has been at work—something felt better than described—and which to even the uneducated conveys a sensation of truth and beauty that would be absent were that same subject delineated by one who did not possess that knowledge of art that shines out of a clever work, and appeals so forcibly to the observer, exerting in all a more or less sympathetic and mysterious influence, which increases in intensity proportionably as the observer understands and appreciates true art.

By reason of the very process we use—a process better adapted than any other for giving truthful representations of detail—we must endeavour to arrange the composition so that objects near at hand and forming the foreground receive the principal consideration; then, by waiting for a suitable effect of light, we may succeed in the production of an artistic work, in which the detail is most elaborate but not obtrusive, but will, in *reality*, be a work of art. We all know that to obtain the best results which photography is capable of affording is by combining manipulative skill with artistic feeling. Those who consider that the mere effects of light and shade, with only indications of form, is the acme of photographic perfection, grievously err. The picture may be artistic, I will allow; but were the same subjects produced under the same conditions of light and shade, with the addition of manipulative skill, who would hesitate to give a verdict in favour of the latter? We have in such a finished picture the rendering almost microscopically of each particular atom without such elaborate drawing interfering in the least with the general effect. Many of our most eminent painters did not, and do not, scruple to spend much time endeavouring to make the texture of their paintings approximate as nearly as possible to the effects of nature on those portions which constitute the foregrounds of the pictures. Why, then, when we have this power, should we cast it aside, and ignore what the artist on canvas so assiduously and unweariedly endeavours to work out? This plan, however, some endeavour to instil into the mind photographic; for there is no theory, however absurd and dogmatical it may be, which, if put forward with plausibility, fails to make some few converts. In a recent and excellent work upon landscape painting, photographs are dubbed "philosophical productions, the most perfect of which is wanting in pictorial effect." Now this is gratuitously running down our especial hobby; for it is very certain that very many of the productions of our best photographers are as perfect in all respects, and especially in pictorial effect, as other productions that are limited to monochrome; and the very attempt to undervalue such works can proceed from nothing but a wilful blindness, or feeling of jealousy.

To return: the foreground must of necessity, from the method we use in copying it, be that portion of the picture on which is concentrated the chief powers and beauties of the process, and which, as a matter of course, is calculated to show these powers to the greatest and best advantage. To make the best use of the conditions imposed upon us, we had better content ourselves with a small quantity of matter well arranged in preference to wide and extensive views, for the reason that the more extensive the landscape the more difficult it is to get a combination of those effects at one and the same time that will give the artist satisfaction, and which would be comparatively easy were the attention directed to a more limited range of subject. Not that I would deter anyone from attempting any subject whatever on account of its difficulty, for the greater the difficulty overcome, the greater the credit that will be attached to the completed work; but, as a rule, in a process whose beauties are so very dependent upon accidental arrangements of nature, and oftentimes entirely out of control of the artist, it may be as well to select those subjects that present the fewest difficulties and the greatest chances of success. This admitted, we at once perceive the necessity of paying the greatest attention to objects near the camera; and to aid the perspective, these should be so arranged that the principal lines assume a triangular disposition, the base of which triangle will be the immediate foreground. By neglecting this arrangement, objects in the finished photograph seemingly occupy a different relative position with regard to each other than in nature, and the error is very palpable when too late to be remedied.

In choosing our subject, we should endeavour as much as possible to avoid those objects whose surfaces reflect much light; for a multitude of highly-reflecting surfaces will produce an unavoidable chalkiness. The colours to be selected should be subdued, not positive or brilliant, when choice is possible. A similar form must not be too often repeated in the same picture, especially if that form nearest the eye is smaller than the one some little distance beyond, for that would tend to give a false idea of the linear perspective, especially if the ærial perspective is at all deficient.

If figures be introduced into the foreground, their action should be represented so as to harmonise and combine with the subject; not to look as if they did not belong to it, and were merely set there to be photographed. Seldom or never will a modern fashionable dress harmonise with anything save and except a modern architectural subject; therefore, the rough and rugged country attire is to be preferred as most suitable and picturesque. These little matters being well remembered, the manipulations carefully performed, and last, but not least, the exposure properly timed, which is half the battle, we may succeed in satisfying ourselves and pleasing the public by making truthful, beautiful, and artistic pictures.

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MEASLES: HOW TO GET THEM, AND HOW TO GET RID OF THEM.

BY J. R. CLEMONS.*

Having several complaints made to me of the occurrence of that dreaded and well-known disease, the measles, in various kinds of paper, I made a course of experiments specially to try if I could get the measles to appear in my prints, and then to try to get rid of them. I succeeded in doing both to my entire satisfaction, and think that my plan of getting them is the usual one, but not being generally known, causes those who are occasionally plagued with them to mystificate and worry considerably, and makes them try one random plan and another to get rid of them, like a canine with his head in a bag; and the more they try to get rid of them, the more they come. Now for the experiments. From an ordinary silvering solution, of strength of 40 grains to the ounce of water, take 1 ounce, and precipitate it with a solution of caustic potash, and afterwards thoroughly wash it free from all traces of lime, and allow it to stand over night. Then filter this, except the oxide, which leave in stock bottle, and when done silvering pour the silver back and shake it up and let it stand till wanted. Now, take three pieces of the same sheet of paper, and mark them 1, 2, and 3, and silver each piece one and a half minutes. Let No. 1 be silvered, dried, and printed in the usual way. No. 2 treat in the same way, and fume it ten minutes, and print. No. 3 should be treated in a like manner, fuming twenty minutes, however. After printing, No. 1 will be found yellow, No. 2 slightly yellow, and No. 3 purely white and clear. After toning, No. 1 will be found full of measles; No. 2 similarly affected, but not quite so badly; and No. 3 quite free from any attack of the disease.

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* *Philadelphia Photographer.*

In another experiment I placed part of a piece of paper between pieces of glass, to prevent the fumes of ammonia from reaching it, and fumed the other end one hour. I then printed upon and toned it. The end that had been fumed was clear and nice, while the parts protected by the glass had a severe attack of the disease described. In all these experiments, parts of the same sheet of paper were used.

My silvering solution is made as follows:—

Nitrate silver	480 grs.
Water	16 oz.
Caustic silver	30 grs.
Alcohol	20 oz.
Aq. amm.	48 drops.

Fume 20 minutes or more.

It will sometimes occur that the paper is slightly damp when taken from the fuming-box. It should be thoroughly dried before printing. Some papers require more fuming than others, which can be ascertained by experiment as above. If the paper turns yellow, bronzes in printing, or tones harsh in the shadows (which latter is the case with all paper containing gelatine in the albumen), the strength of the silver solution should be reduced. By carefully regarding these statements, many who are vexed in this way may effectually stop such precedure on the part of the paper.

It is the treatment of the paper, and not the paper, that brings about such results as photographers are too prone to declare.

EXPERIMENTS WITH MR. M. CAREY LEA'S COLLO-DEVELOPER.*

Desiring to make a fair trial of the merits of Mr. Lea's collo-developer for our own satisfaction, during the last week we made a large number of experiments with it, and have arrived at the following conclusion:—

The collo-developer acts more rapidly than the ordinary iron developer, the high lights being very intense, flashing out the moment the developer touched the plate; but the middle or darker portions of the picture do not, in our experience, compare with the iron development in softness and delicacy of middle tints. A tendency to fog was frequently noticed in the high lights, when the development was pushed to bring out the middle tints.

We both experienced difficulty in making Mr. Lea's developer.

On adding the solution of protosulphate of iron to Mr. Lea's solution, a slight milkiness appeared, which filtered off entirely clear; but after standing twenty-four or forty-eight hours, a bulky precipitation of oxide of iron was noticed. This was carefully filtered off, but the developer worked unevenly, giving a curious deposit in the sky, also quite streaky. Alcohol was added, which made it flow more evenly, but did not remedy the latter difficulty.

Many of our trials were made with a stereo box, cutting the glass before coating the plate; after exposure, breaking the glass, and developing one with the collo, and the other with the iron. One of the stereo plates with the above-mentioned deposit, with questions in regard to the precipitation of iron, was sent to Mr. Lea, who replied that he had never found his developer to give such results before, but suggested that some difficulty might occur from the iron used, asking a trial of some of his own. Another solution was at once made on Tuesday, at 3 p.m., which, up to this time, Wednesday, at 3 p.m., has not precipitated.

One more trial was made this morning with the fresh solution. A cut stereo plate was coated with collodion, containing iodide of am. 5 grs., bromide of cad. 2 grs., dipped in a new bath, which was known to work well; exposed for thirty-one seconds on the Pennsylvania Hospital Square, with a pair of Jamin lenses, view adjustment, focus about 7 inches. The plate was broken, and developed—No. 1 with collo; No. 2 with protosulphate of iron 20 grs., water 1 oz., acetic acid 2 drs. The development with the collo came up quite fast in the bright portions, but slow in the shadows, showing decided evidence of fogging in the bright lights. The plate was at once washed, and No. 2 taken up. Ordinary iron was used; development rather slow, but uniform, coming up gradually. The developer was kept on longer than the collo, but no tendency to fogging was observed. The two negatives are here for your inspection. No difficulty was found in flowing this collo-developer, although no alcohol had been added, as in every trial made before.

In concluding our experiments, which have been made with a great deal of care, we are of the opinion that Mr. Lea's collo-developer is not, in its best working, quite equal to the ordinary iron developer for landscape or portrait views. In regard to copies, we think the preference might be given to the former.

Further trials confirm the above in most points. Mr. Lea's developer was made on the 25th ult., from his formula, viz.:—

Protosul. iron ...	1 oz.	avoirdupois.
Water	16 ,,	fluid
Mr. Lea's preparation	½ ,,	,,

On first trial, 27th ult., it was found to work unevenly: 1 oz. Atwood's alcohol was then added; it was flowed then without difficulty.

The iron developer was made as follows:—

Protosul. iron	240 grs.
Water	8 oz.
Acetic acid	1 ,,

The collodion used was an excellent sample, furnished very kindly by Mr. Wenderoth. We are about to experiment further in this direction. For further remarks on the subject, see minutes Photo. Society.

Since the above article was written, a marked precipitation has taken place of oxide of iron in the collo-developer made with Mr. Lea's iron. J. C. B.

PHOTOGRAPHS ON OPALINE GLASS.

The *Comptes Rendus* has the following:—"M. Penabert forwarded to the meeting of the Academy of Sciences in Paris, on the 18th of December last, a specimen of photography upon opaline glass, stated to be unalterable, and of which he gives the following description. He says: "These photographs must not be confounded with those already known in England, America, and France under the name of *photographs in porcelain.* The following is the process for their production:—Upon a properly cleaned opaline glass diffuse the following substance:—Ordinary collodion, prepared with the well-known materials, but at least a year old (for I have remarked that this answers best); immerse the plate for three minutes in the following sensitizing bath:—Seven grammes of nitrate of silver to 100 grammes of distilled water, adding 16 grammes of pure nitric acid to each 2,000 grammes of this solution. Expose the plate in the camera for about fifty seconds.

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* Read before the Philadelphia Photographic Society, March 7, 1866, by Messrs. J. C. Brown and Hugh Davids.

"The image is developed with a solution of protosulphate of iron, such as is usually employed; but this solution must be diluted with two-thirds more water, and have an addition of one-fifth of pyroligneous acetic acid.

"When the image is properly developed, which requires a certain amount of time, fix it in a very weak solution of hyposulphite of soda. Tone the image in a very weak bath of sulphuret of ammonium, and wash it well.

"These photographs are obtained directly as positives, and M. Penabert states that they are so unalterable as to resist even the action of acids."

[Some further explanation is surely required here. The process described would produce black negatives, not positives, unless some unexplained reverse action of light take place.—Ed.]

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Proceedings of Societies.

London Photographic Society.

The usual Monthly Meeting of this Society was held in King's College on the evening of Tuesday, the 8th inst., Mr. Bedford in the chair.

The minutes of a former meeting having been read and confirmed,

The Chairman regretted that the promised medals could not be distributed that evening, chiefly owing to the indisposition and inability to attend of the Chief Baron, their President.

The Secretary (Dr. Diamond) said that the President would endeavour to be at the Soirée, and also at the next meeting of the Society in June, at which meeting he would distribute the medals,

The Chairman said the Soirée would be held on the 7th of June, in the large hall of the College, and as it was found, unfortunately, that photographic exhibitions did not pay, and there would be, therefore, no public exhibition this year, it was intended to make this an Exhibition Soirée, and he hoped members generally would contribute pictures, so that this feature of the Soirée might be well represented.

Mr. Allen then read a short paper on the Angle of Human Vision. He said that he believed a general impression prevailed that the angle of vision was much larger than it really was; in fact, with the eye perfectly stationary, there was not, so far as his observation went, an angle of more than 10° sharply defined by the eye. The rapidity with which the eye could be moved, and the mode in which the mind appreciated as one picture what was really a series of images seen in rapid succession, gave the impression of the larger angle of vision which many persons entertained.

The Chairman invited discussion. No remark being made, he said that it had been announced that Mr. Grisdale's Washing Machine would be exhibited; he had written to say that, owing to some misunderstanding, he would not be able to exhibit it that evening.

The Secretary read a letter from Mr. Dallmeyer, accompanying a series of magnificent photographs by Mr. H. P. Robinson, stating they were produced by a new triple lens intended for portraits and groups; the 12 by 10 pictures by a lens of 3 inches diameter, and the 16 by 12 pictures with a 4-inch lens, the exposure being in each instance about twenty seconds.

The pictures in question consisted of portraits and rustic figures, with characteristic pictorial backgrounds, some of them taken in direct sunlight, with various beautiful effects of light. For exquisite modelling and perfectness of texture, as well as for admirable feeling, expression, and fine composition, it is not too much to say that these were some of the finest photographs which have ever been exhibited.

Mr. Dallmeyer, at the request of the Chairman, made one or two further explanations. He mentioned a very beautiful series of group of Eastern figures, by Mr. Hart, taken with the ordinary triple lens which he had introduced some years ago; these were produced in from fifteen to twenty seconds in the open air. The effect was so satisfactory that he had been repeatedly asked if he could not make a triple lens to do similar work in the glass-room, for which the ordinary triple was not sufficiently rapid. This he had done some time ago in a few instances, but he had not manufactured them regularly. At length he had been induced to give the matter careful attention, to ascertain whether he could not, by sacrificing a little in angle, make such a modification of the triple in the form and foci of its components, as would permit the use of a large negative lens and aperture, secure rapid action, and give sufficient distribution of definition, with sufficient sharpness for pictorial purposes. This he thought had been effected, as Mr. Robinson's pictures would fully illustrate. He believed it would be impossible with any double combination in existence to produce such pictures with an exposure of from fifteen to twenty seconds. This form of lens, which would, he thought, take the place of the ordinary portrait lenses for large pictures, was not, he ought to remark, the most suitable for views.

The Chairman had examined the pictures, and found them as perfect in definition throughout as anyone could wish produced by any lens. Holding up a 16 by 12 picture, he remarked on it as especially perfect, and asked the size of the lens with which it had been produced.

Mr. Dallmeyer said that especial picture had been produced with a lens of 12 inches focus, and was only intended for 10 by 8 pictures. In Mr. Robinson's hands it had given perfect results on a 16 by 12 plate; but he should not recommend the use generally of the small lens for such large plates.

Mr. Robinson said that the peculiarly fleshy texture which, it had been remarked, characterized the faces, and fullness of texture throughout, he attributed entirely to the lens. It gave qualities, in this respect, which he could not obtain with any other lens.

Mr. Hart then exhibited the working of his Economic Filter, and showed that the solution might be withdrawn from the bath into the filter, and returned clear to the bath without spilling a drop.

Mr. G. Hooper then explained the working of the Graphotype Process, described some time ago in our pages. He also showed some very interesting specimens of its results, and expressed a hope that a means would be found to render photography available in connection with this process.

After some votes of thanks, the proceedings terminated.

North London Photographic Association.

The usual Monthly Meeting of this Society was held in Myddelton Hall on the evening of Wednesday, May 2nd; Mr. W. Warwick King in the chair.

The minutes of a former meeting having been read and confirmed,

Mr. Dunmore read a paper on Foregrounds in Landscapes (see p. 222).

After some conversation on the subject, in which Mr. Hill, Mr. Allen, and Mr. Simpson took part,

The Chairman, in offering the thanks of the meeting to Mr. Dunmore, expressed a high opinion of the value of such papers. A foreground might easily mar the whole picture for want of a little attention. He remembered once taking a church, the beauty of which at the time so absorbed his attention, that he overlooked a hedge, in the immediate foreground, covered with clothes hung out to dry. The introduction of a suitable figure into a foreground, in rustic costume if possible, or sometimes even in modern everyday costume, was of infinite value; and he remembered no better example than that in one of Mr. Robinson's landscapes (called *Early Spring*), in which a girl on the banks of a stream running between overhanging trees lighted up the whole picture.

The Chairman then called attention to a couple of photographs sent by Mr. Ross to show the working of his Doublet Lens.

Mr. How exhibited a very convenient Portable Syphon.

After some desultory conversation, the proceedings terminated.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 7th May, 1866.

M. Niepce de St. Victor has just communicated to me the results of his recent experiments. Everybody knows that he obtained, some months back, very intense blacks in his heliochromic proofs, by means of the process which was the subject of his last paper; but owing to further changes made in his manipulations, he has succeeded in producing not only blacks as strong as those of the ordinary photographs, but also an effect of relief which would induce the beholder to suppose that his plates had been made from painted medals or sculptured ornaments.

To obtain these blacks he has modified his process as follows:—After preparing the plate by using a strong alkaline bath, and covering it with a varnish of dextrine and chloride of lead, he exposes it for a few minutes (from five to ten) to the open light, and *anneals* it in the usual way. The chloride of silver no longer takes the cherry-red tint as previously, but an orange one. After the *annealing*, he exposes it under the cliché for five or ten minutes. The blacks and whites of the proof are very vigorous, but the other colours are less decided.

The relief is obtained in this way:—After chloridizing the plate and applying the varnish (of dextrine and lead), he exposes it under the cliché. (M. Niepce uses coloured engravings or paintings on varnished and transparent paper.) An exposure of five or ten minutes gives a proof scarcely visible, in which the blues, reds, and greens are indicated, but not the yellows. He then proceeds to the *annealing*. Under the influence of the heat, the image is developed and assumes its appearance of relief. The reds especially become very intense. He then replaces the proof under the cliché, and again exposes it to the light. The colours now acquire all their intensity, and the relief becomes more striking.

As a diversion from his more serious studies, M. Niepce has been making several experiments which have a present interest. We now see everywhere in Paris, in the shops first and then in private houses, envelopes containing a sheet of blotting paper and one of albumenized paper: the whole is sold for half-a-franc. With the envelope are given printed instructions informing the purchaser that by damping the blotting-paper and applying it to the albumenized paper, he will instantly perceive a photographic image. And such is the fact. The wonder consists in a latent proof on one side, which is developed by means of the substance with which the blotting paper is impregnated. The readers of the Photographic News are well aware that there is nothing new in all this, but it nevertheless astonishes the public, who are less familiar with photographic processes.

In studying this question, M. Niepce has found several means of obtaining a similar result, and among those which he has mentioned to me, I will cite the following:—

Take a photograph not prepared with gold, pass it through a solution of bichloride of mercury, and the image disappears. To make it reappear you have the choice of several solutions,—chloride of gold, and hyposulphite of soda; sulphide of sodium; all the alkalies. Here there is an advantage, which is, that in taking the portraits of your friends, for instance, you may, at a party, make them appear successively as if by enchantment.

M. Sarony has lately assembled several of our principal Parisian photographers to show them his posing apparatus and explain the mode of using it. Many experiments, already well known to English photographers, were made with it, and I am happy to state that the invention met with very general approbation.

Several proofs by Mr. Swan were presented on Friday last to the French Photographical Society, and were very much admired. It is, indeed, impossible to produce anything more complete or more artistic. Ernest Lacan.

ON PHOTOGRAPHIC PAPER.

Sir,—A few remarks on an article of so much importance to photographers may not be uninteresting, coming as they do from one in India who has had his share of troubles from inferior samples of paper.

The paper most in use in this part of the country is Schering's imperial, and it is a fair paper for all purposes, gives excellent and *uniform* results when fresh, but, like all other albumenized papers, deteriorates rapidly in this extreme climate, and few samples will give that perfect gradation that should be in a good portrait negative, after it has been two years in the country. The enamel paper, by the same maker, has given excellent results in my hands, although many of my photographic friends decry it. It is very liable to crack, spots appear on the surface after keeping for a rainy season, and in some samples the enamel seems to have been applied with a brush, for similar markings are visible in the paper before sensitizing, and give tones of different depths in the finished picture.

The advantages are, that great delicacy of definition is secured; it is hardly possible to bronze the shadows even in an Indian sun; and a magnificent tone is always at command. I can always rely on a good toned print from a negative of average quality. It must be a very weak and bad negative that will give an ill-toned picture with this paper, and if the faults I have pointed out were removed, I would never care to use any other paper.

I have enquired from several agents in England about getting improved qualities of the paper, but am always told that the paper does not give satisfaction, and they have discontinued importing it.

Is not albumen the worst possible substance to apply to the surface of paper, where permanency is a main object? I doubt whether any print on albumenized paper, by any process, can be said to be permanent.*

Getting a smooth glossy surface by means of collodion is a step in the right direction. I am not aware whether paper prepared with chlorided collodion has been manufactured for use with the ordinary sensitizing bath, but I think the experiment worth a trial. We want something to fill the pores of the paper so as to prevent the sensitive material from sinking into the paper. I see the Albion Albumenizing Company of Glasgow have endeavoured to secure this end by a double coating of albumen; but albumen does not appear to be the best substance for this purpose. Enamelling the paper would be better, but the liability to crack of paper so prepared is a great drawback. If some tough and elastic substance could be mixed with the enamel, and a collodionized surface given to such a paper, I would predict for it the best possible results.

In the patent paper which I have lately used for cartes, the pores are said to be filled with India rubber. The definition is better than with ordinary paper, but still not so good as with the enamel. Like the enamel, but in a lesser degree, it is liable to crack.

There is one great want in the disposal of albumenized paper: every quire of paper sold should have a toning formula printed and affixed to the cover containing it. I am not aware whether this is done at home or not, but we seldom get a formula with paper purchased in this country. I had a parcel of albumenized *Saxe* paper sent me some time ago, and I never saw a sample that promised so well to the eye turn out so bad as this did. I never could get a decently toned picture with it, and I attribute this solely to the fact that I was using a formula that was unsuited to the paper, as I had seen excellent prints on the same paper that had been sent to me from England. From a few months' experience, I would almost say that a formula working well with *Rive* paper will not answer with *Saxe*.

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* There can be little doubt that under all circumstances albumenized prints are wanting in entire permanency.—Ed.

Wax seems a substance well adapted for filling the pores of paper, and if it could be used in conjunction with enamel in a manner that the paper would not become transparent and remain white, good results would ensue.

I have just received tho Photographic News for 26th January, 1866, with the print of the "Mountain Dew Girl." The process is full of promise, and leads us to look forward hopefully to a time not far distant when we may possess prints that will at least be permanent. Is the specimen print on ordinary plain paper, or albumenized, or collodionized?

I had a sample of papers lately sent me by Lampray and Co.; the best of it was the patent sample. *Rive's* medium also gave good results at first, but after the monsoons the albumen sunk into the paper, and it is not now fit for card portraits. S. S. C.

Lahore, 20*th March*, 1866.

[The "Mountain Dew Girl" was printed on paper prepared expressly for photo-relievo printing.—Ed.]

A GOOD GLASS ROOM, ETC.

Sir,—As information on the best mode of building the studio is just now a desideratum, perhaps the following description of one, found to answer well, may be acceptable to those who are compelled to build with the same aspect.

In length, running due north and south, 35 feet; breadth, 13 feet; height of side wall, 8 feet; height to ridge, 13 feet; blank wall from south end, 5 feet; east side-light, 12 feet; west side-light, 8 feet; east skylight, 16 feet; west skylight, 8 feet. The side-lights run down to within 18 inches of the floor, and are separated from the skylights only by the frame; both sky and side-lights are divided into 4 feet frames of 3 squares breadth, the top sashes of the side-lights being made to slide down, and the lower sashes of the skylights to slide up under the upper ones: this mode of opening enables the operator to work in fine weather with a high side-light of open sky.

In consequence of its situation, the northern end would be illumined with the direct solar rays. To prevent this, the skylights are obliged to be shaded with louvre blinds, arranged three to each skylight, except the additional one on the east, which is furnished with a screen the size of the light. The louvre boards of each light are arranged in threes by connecting rods in the middle, and furnished with cords and pulleys to shut up the light entirely when necessary. The additional skylight, with its large screen, is for the purpose of reflecting sunlight on to the sitter for rapid exposures, and is so efficient in taking children, that if the operator has many to take, it would be advisable to extend the west skylights equal to the eastern. As this screen is useless after one o'clock, it is painted in flatting, of a pale blue, and made to rise and fall to any angle, or shut the light entirely by a cord and pulleys. On a fine clear summer's morning, fully exposed negatives are taken in this studio in two or three seconds.

An article appeared in the News, a few weeks ago, on the peroxide of hydrogen and its mode of preparation, in which the writer lamented that its extreme dearness, consequent upon the difficulty of manufacture, prevented the extended use of this oxygenant.

Although a photographer, I am not much of a chemist, and am ignorant of the uses of this compound; but I think I can suggest a mode of preparation by which it could be made cheaply on a large scale.

If boiled water be charged, by means of a force-pump, with oxygen, there is one, and only one, cause in operation which prevents the chemical combination of these elements, and that is, the presence among them of the solar force of repulsive separation. There are three different means of overcoming the resistance of this force, each of which ought theoretically to be successful: first, by increasing the power of the cohesive force; this can be effected by successive discharges of electricity from a battery: secondly, by driving off the solar force, which is accomplished by subjecting the liquid to the action of extreme cold:* and thirdly, by combining both these modes of procedure.

By either or both of these means combined, a chemical union of hydrogen with oxygen ought, by theory, to be readily effected in any proportion known to chemistry.—I am, Sir, respectfully yours, T. A.

THE PHOTOGRAPHIC BENEVOLENT FUND.

Dear Sir,—Pressure of business must be my excuse for not writing to you sooner, for the purpose of formally making the offer I some months since privately made to our friend Mr. Dring, to contribute twenty guineas in aid of your most laudable enterprise, provided twenty-five other similar sums are subscribed within six months from this date. As I have no doubt the required amount will be speedily forthcoming, the sum of five hundred guineas thus raised will form a very respectable nucleus for an endowment fund, which will, from time to time, receive additions from various sources. This sum and its additions should, I think, be capitalised and invested, and the income only applied to the purposes of the Benevolent Fund. As, however, for some time to come, we may not expect the revenue from that source to amount to any considerable sum, it will be necessary to raise a larger and immediately available income, by means of annual and other donations and subscriptions, towards which my firm may also be relied upon for something annually, till notice to the contrary.—I am, dear Sir, yours truly, Thos. Lampray.

44, *Paternoster Row, London, E.C., May* 6, 1866.

Sir,—As the time of year is now approaching when those most nearly concerned in the success of this undertaking can best afford to subscribe something, however little, towards its funds, will you allow me to suggest that you strike the iron whilst it is hot, and that the Secretary call a meeting at some public place, say the London Coffee House, Ludgate Hill, for instance (unless a suitable room can be obtained for the purpose free of cost elsewhere) at which the necessary initiatory steps may be taken? Due notice of time and place should be given in your next impression. There will surely be no difficulty in procuring donors and subscribers when the scheme is once fairly floated. But even if we do not find the fund progress at first as rapidly as wo could wish, there is no reason why it should not be developed by degrees, as many other institutions of a similar character have been. I presume the Fund will comprise within the sphere of its operations persons employed in any of the trades collaterally connected with photography, as well as those actually engaged in the practice of the art.

I would also suggest that there can be no impropriety in appealing to the sympathy of the numerous wealthy amateurs, many of whom would doubtless respond liberally if called upon.—Yours faithfully, Sigma.

[We hope by next week to be enabled to announce that arrangements for holding such a meeting havo been made. —Ed.]

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* Protoxide of nitrogen is a well-known instance of the efficacy of this mode of treatment. By subjecting this gas to a pressure of fifty atmospheres it assumes the liquid form; it can be made to retain its liquid condition, on the removal of the pressure, by the action of extreme cold; elevation of temperature is, however, followed by the liquid again assuming the gaseous form.

Talk in the Studio.

The Exhibition of 1867.—The Emperor Napoleon has, we understand, availed himself of photography to preserve a record of this exhibition. Photographs of the progress of the works are forwarded from week to week to the Imperial Commission. It is calculated that the whole of the building will be completely roofed in by the 15th of October.

To Recover Gold from Solutions.—To recover the gold, put a stick of bright zinc into the solution. Zinc will precipitate gold from any solution.—*Scientific American.*

Simple Process for Silvering.—An employé of the Bavarian Mint has published an improved process for silvering copper, brass, and other alloys, by means of a solution of silver in cyanide of potassium. The difference from the usual method consists in the use of zinc filings, with which the objects are coated; when the silvering solution is applied, an immediate deposition of a much more durable character taking place. The filings are easily removed by rinsing in water, and may be used repeatedly for the same purpose. Metallic iron may be coated with copper in the same manner, by substituting for the silver a solution of copper in cyanide; and over this copper deposit a coating of silver may be applied.—*Scientific American.*

Method of Separating Silver from Galena.—If sulphuret of silver is melted with chloride of lead, a decomposition takes place, and sulphuret of lead and chloride of silver is formed. If, therefore, galena, which consists of sulphuret of lead, with some sulphuret of silver, is melted together with chloride of lead, the silver is extracted from the galena, and lead takes its place. On this principle depends the new process, which is carried out as follows:—The galena is mixed with 1 per cent. chloride of lead and 10 per cent. common salt. If it contains much silver, a greater quantity of chloride of lead is added. The mixture is melted, and the chloride of silver formed by these means, together with the salt, floats on the top, and can easily be separated from the pure galena. The mixture of chloride of silver and common salt is afterward melted together with lime and charcoal, or treated in some other suitable manner, whereby the silver and the lead contained in the remaining chloride of lead is reduced. The mixture of silver and lead thus obtained is afterward separated in the ordinary manner.

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To Correspondents.

*** We are again compelled to appeal to the consideration of our advertising friends, many of whose announcements are compelled, by the pressure on our space, to stand over.

Lizard.—In producing an enlargement on a wet collodion plate a condenser is not necessary. If you place your negative in the aperture of a dark-room, and receive the image, enlarged by a lens, on a wet collodion plate, an exposure of from a few seconds to a few minutes will give you a transparency. If a transparency be placed in the aperture, the same proceeding will give you an enlarged negative. A mirror or a sheet of white paper placed at a suitable angle to reflect the light from the sky will facilitate the operation. 2. Plain collodion means a simple solution of pyroxyline in ether and alcohol, without salts of any kind added; and it is to such plain collodion you must add the nitrate of silver and chloride of calcium to make collodio-chloride of silver. 3. Various metallic salts besides nitrate of silver, such as bichloride of mercury, &c., will coagulate albumen. Heat and alcohol will coagulate wet albumen, but not dry albumen. 4. There are various modes of recovering silver from washing waters and old hypo. You will find the detailed instructions given in our Year-Book for 1864 the most suitable. We do not know to which method you refer without a more definite description.

S. S. C.—The tone of your enamelled print is good. It is our conviction that the carbon process will eventually supersede silver printing, and in that case the paper question will cease to be troublesome.

Marsh Photo.—We do not know much of the lens you mention, but for certainty of excellence should prefer one by an English maker. 2. Throw down the silver in the waste solution as a chloride, and then send it to a refiner.

Amicus.—It is probable that the sample you describe is old and decomposed. The exposure, when things are in proper condition, for the printing of collodio-chloride plates, requires about two-thirds of the time of albumenized paper. Why not make your own, according to the formula we have published?

E. W.—With a little management, you may, in a room of the size you describe, so arrange blinds as to secure great control over the light, and may convert the front-light into a high side-light. It will be well to furnish the entire skylight with a double set of blinds, one white and the other dark blue, so divided that you can always have one half of the skylight covered, under which the sitter will be placed, the light reaching him from the other half. The specimen you enclose indicates the presence of too much front-light.

An Old Subscriber.—The keeping qualities of the plates prepared after the formula of Mr. Gordon remain to be tested. Mr. Gordon has prepared and exposed a number of plates, and intends to develop one every week for the next six weeks, to compare the results. One already kept for a week showed no change at all. 2. It will be well to change the second water after every three or four plates, taking that which was second for first, and throwing the first away.

Y. Waterloo.—Both are good. The first the most powerful, the second most convenient.

Chemicus (North Wales).—The greenish spots on the Broad Street view undoubtedly arise from imperfect fixation. The print has either stuck to another, and thus prevented the free action of the hypo upon it, or, what is as probable, air-bubbles have formed on it, partially protecting the surface. The minute spots on the other also probably arise from the latter cause. See article and letter in a recent number on the subject.

A. Z.—We should prefer design No. 2; and think that, by proper management, such a room might be made to answer very well. The picture enclosed is not badly lighted, but indicates a little excess of front light.

J. A.—A solution of chloride of lime, carefully applied with a sponge, followed by gentle washing with clean water, will renovate and clean old and spotted engravings.

Developer.—Calico answers perfectly well for blinds, and is the cheapest material you can use. The mode of arranging must always depend on local circumstances, such as the shape and size of the room. For the side-lights we prefer them to slide. In our Year-Book for 1864 you will find a diagram and description of a good method of working the blinds to the skylight. The card enclosed is pretty good.

E. Sawyer.—We shall have pleasure in seeing some of your work. We shall possibly be in your neighbourhood shortly, and will, if we can, find time to call on you.

Detail.—The use of nitrate of silver from the bath solution for intensifying is undesirable, often interfering with cleanliness and delicacy of the deposit. 2 Gutta-percha, if perfectly pure, will not hurt the silver solution, but many, if the vessels made are not of pure gutta-percha, and injury to the solutions often follows. 3. We cannot say what capital would be required to commence a photographic business, so much depends on circumstances. It might possibly be done in a small way for one hundred pounds; and we know a portrait business which was recently sold for six thousand pounds.

A. Noakes.—The spots appear to be the fault of the paper. The want of purity in the whites is probably due to the presence of white light, either in exciting or developing. For developed prints, a much more careful exclusion from light at every stage is necessary than is required for albumenized paper.

J. J. C.—We believe that a committee for managing the British portion of the photographic department in the Exhibition of 1867 has already been appointed, but has not yet been publicly announced. We will write again shortly.

Holland.—A fixed, but not toned, silver print should be used. If the print be toned, the gold considerably protects it from the bleaching action of the mercury salt. If bleaching be effected without fixing, the brown mottled stains of imperfect fixation appear, as in the examples enclosed; as the amount of hypo in the blotting-paper is insufficient to fix the print, it produces the stains of imperfect fixation.

Inquisitive.—We did not find any picture enclosed in your letter. It is always desirable to varnish collodion negatives.

H. S.—According to the Act which confers copyright in engravings, it is necessary that each print should have the name of the publisher and the date of the publication printed on it. This is technically known as the publication line. Publishers failing to attend to this seriously endanger their copyrights, and it would be difficult to recover penalties for the copying of a print in which the publication line is not present. This question has been the subject of much litigation, inasmuch as many publishers have issued proofs before letters, without such a line, of pictures the copyright of which they wished to preserve. As the question has been one which has occupied much time in courts of law, and remains in some uncertainty, we cannot undertake to give you a definite answer upon which you may run risks. We can merely tell you that the Act provides a certain condition, and that it should follow that if this condition be neglected, the protection of the Act would be lost. In the copy you send, the names are simply those of the painter and engraver, and do not constitute the compliance with the Act. When the term of a copyright expires it becomes public property. The picture you enclose is not copyright. It is a copy of Guido's Ecce Homo, apparently from a worn-out bad lithograph. The photography is pretty good; but the negative is apparently a trifle under-exposed.

Stereo.—In cutting out stereo pictures from a pair of negatives taken on a plate 8 by 5, you may select such portions of the view as may make the best picture; but you must take care that each half includes exactly the same objects. 2. The name you mention is not that of a maker, but of a dealer, who gets his name engraved on lenses made by some one else, probably of no name or reputation. The lenses may be good or bad, but the name often in such cases is not a guide. 3. It is probable that you can work very well out of doors with the same collodion and developer as you find answer in the studio. 4. Your pictures are, on the whole, very good; that of the lady is best. The portraits of gentlemen are good photographically, but the art qualities are a little at fault. There is a little stiffness and want of good composition.

"Further Remarks on Tunnels, Front-Light, Etc.," and other articles, are again compelled to stand over.

Several Correspondents in our next.

*** All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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REMOVAL OF HYPOSULPHITE, AND PERMANENCY OF SILVER PRINTS.

Anything which may, in however slight degree, tend to promote the permanency of silver prints, must be matter of interest to the photographer; for, although it cannot be doubted that, for the best class of work, carbon must eventually supersede silver, yet it is probable that the present mode of printing will continue in use, especially for some classes of photography, for some time to come. The proposition, then, of Dr. Angus Smith, in a communication which will be found on another page, read at the last meeting of the Photographic Society of Scotland, to aid in eliminating the hyposulphites from silver prints by means of peroxide of hydrogen, will necessarily excite interest and attention.

About two years ago we undertook some experiments with peroxide of hydrogen, to test its action on faded prints. A slight bleaching was the chief result, and, in some instances, a little general improvement in the appearance of the print; but, on the whole, the advantage obtained was not so great or so promising as to induce us to carry the experiments further.

The object of Dr. Smith is not to deal with faded prints, but, if possible, to prevent fading by removing some of the causes to which that effect is due. The peroxide of hydrogen is, practically, water containing two equivalents of oxygen instead of one, and the extra equivalent, being in a very loose state of combination, is very readily given off. The addition of oxygen to a hyposulphite will convert it into a hyposulphate or a sulphate, and this is the intention of the use of peroxide of hydrogen, or oxygenated water, proposed by Dr. Smith. A perfectly fixed and carefully washed print may contain, at the end of the process, some traces of the double hyposulphite of soda and silver, and of the hyposulphite of soda; and if the proposed action, which, theoretically, will probably take place, be satisfactorily completed, these traces may be converted into sulphate of silver and sulphate of soda, which, it is hoped, will be more easily eliminated, or prove more stable, than the hyposulphites.

Much of the advantage is still problematical, and will require long testing to arrive at a satisfactory conclusion. A perfectly fixed silver print, when perfectly washed, has, we know, a moderately fair tenure of permanency; but we know that it will inevitably change eventually. The presence of any sulphur compound of silver, sulphate or hyposulphite, does not afford encouraging ideas of permanency. Perhaps by far the most common cause of fading is the formation of a trace of sulphide of silver in the process of fixing, and this, once formed, is not easily eliminated. But, after all, the hyposulphite fixing is not the most fatal cause of change. It is to the use of albumen in the print, and the formation of the insoluble albuminate of silver in the whites of the print, that certainty of more or less change is due. So long as albumen is used in printing, a certain amount of deterioration in the print is, we believe, inevitable. If, as we believe—at least, for high class photography—the days of silver printing are numbered, this is not a question of vital importance. We shall, however, experiment further with the peroxide of hydrogen, and report. At present the preparation is difficult and the price rather high. Dr. Hoffman has recently suggested a mode of preparation which will be less troublesome than that hitherto practised, and may possibly eventually affect the price.

Those of our readers who are anxious to experiment, will be able to get peroxide of hydrogen of Mr. Robbins, of 372, Oxford Street, who has given especial attention to its manufacture.

THE ORIGIN OF FIXING PROCESSES.

The power of fixing the image produced on a sensitive surface by light is the corner-stone of photography. That the sun could produce pictures was known many years before photography existed as a fact; but, like an insatiate and unreasoning monster, it at once proceeded to destroy the images it had made, no matter how beautiful. The power to arrest the action of light was the one thing needful. Sir Humphry Davy, in his observations on Wedgwood's method of producing sun pictures, in 1802, said: "Nothing but a method preventing the unshaded parts of the delineations from being coloured from exposure to the day is wanting to render the process as useful as it is elegant."

The method required was a means of removing from the paper the unaltered chloride of silver, and no such method was found. It is somewhat singular that we do not find that ammonia was tried for this purpose, as its solvent power on chloride of silver had been pointed out by Scheele in 1777. Having prepared some "luna cornua" (chloride of silver) by precipitating a solution of nitrate of silver by means of sal-ammoniac (chloride of ammonium), and blackened it by exposure to the sun's rays, repeatedly stirring it to bring a fresh surface under the action of light, he poured on it some strong ammonia, which dissolved a quantity of "luna cornua," and left a black powder undissolved. This black powder was then treated with nitric acid, and dissolved. Here was the process of dissolving out the unaltered chloride of silver, and leaving untouched the reduced silver—practically, the process of fixing. But there is an immense difference between the discovery of a fact and its recognition as involving a new principle; and notwithstanding the record of the fact that one method, however unsatisfactory, for the purpose of dissolving chloride of silver was on record, the principle of fixing the photographic image remained unknown for many years.

In the course of some recent researches into the origin of photography for another work, it became necessary to verify some of the facts, and we found, on close examination, how vaguely and meagrely given were the statements as to the origin of fixing. On the 31st of January, 1839, when Fox Talbot read his paper on Photogenic Drawing before the Royal Society, he used bromide of potassium for fixing his prints, and he had also tried chloride of sodium. Robert Hunt, the chief historian of photography, in repeated allusions to the matter, says, in general terms, that the use of hyposulphite of soda is due to Sir John Herschel and Daguerre. Turning to Daguerre's first work on the Daguerreotype process, published in August, 1839 (for his process was kept secret until the end of July, 1839), we find the fixing thus described: "In order to remove the coating of iodine, *common salt* is put into a bottle with a wide mouth, which is filled one-fourth with salt and three-fourths with pure water. To dissolve the salt, shake the bottle, and when the whole forms a saturated solution, filter through paper. This solution is prepared in large quantities beforehand, and kept in corked bottles." He then adds: "The solution of salt may be replaced by one of hyposulphite of soda, which is even preferable, because it removes the iodine entirely, which the saline solution does not always accomplish, especially when the sketches have been laid aside for some time." From a very brief consideration of the mode in which this instruction is given, it will be apparent that the use of common salt was the method of fixing with which Daguerre was most familiar, and that the use of the hyposulphite was so comparatively new to him that, notwithstanding that it did the work better, he does not give it as *the* method to be described in detail, but as something which *may* replace the other, already fully described, and as commonly used. This conclusion is borne out by the fact that, in subsequent remarks on the fixing, he speaks of the "saline solution" as that settled in his mind as the fixing agent.,

The question naturally arises, how did Daguerre become acquainted with the use of hyposulphite of soda? A man of noble capacity, largely endowed with grand perseverance and endurance, the result of that sublime kind of faith which—not to use the quotation irreverently—is "the substance of things hoped for, the evidence of things not seen," still he was not a chemist, and it becomes very interesting to know how he obtained his knowledge of the solvents of the salts of silver. In regard to hyposulphite soda, we are able to arrive at a tolerably clear conclusion as to how he *might* and probably did obtain that knowledge. We find that a paper by Sir John Herschel was published, announcing the use of hyposulphite of soda, just five months before the publication of Daguerre's process. In the Proceedings of the Royal Society, March 14th, 1839, appeared an account of certain photographic experiments made by Sir J. Herschel in the preceding January, in which he used hyposulphite of soda for fixing, twenty-three of the prints being exhibited at the time the paper was read.

Finding, as we have said, the record of the history of fixing very meagre, we communicated with Sir John Herschel on the subject, who, with ready courtesy, afforded us every information, and supplied us with a statement of the facts which he had just prepared in answer to a letter, asking information on the same subject, from Mr. A. Brothers, of Manchester.*

From it we learn that the action of hyposulphites as solvents for the salts of silver was fully described by Sir John Herschel in 1819, and that in his first photographed experiments, undertaken before the publication of those of Daguerre or Fox Talbot, it was, as a matter of course, used for fixing. All students of photographic history are aware of how much the art-science is indebted to the labours of this philosopher, but few are probably familiar with the fact that as early as 1819 he had published the facts which might have made photography a possibility twenty years earlier than the period of its actual commencement as a practical fact. We subjoin a copy of the letter to which we have referred:—

Collingwood, October 29, 1864.

Sir,—I think I may very fairly claim the discovery of the hyposulphites as fixing agents, as I believe I was the first to call the attention of chemists to that class of salts and their peculiar habitudes, especially in relation to the insoluble salts of silver.

In my paper "On the Hyposulphurous Acid and its Compounds," which bears date January 8, 1819, and which appeared in Brewster and Jamieson's *Edinb. Phil. Journal*, 1819, occur these words:—

"One of the most singular characters of the hyposulphites is the property their solutions possess of dissolving muriate of silver and retaining it in considerable quantities in permanent solution" (page 11).

"*Hyposulphite of Potash.*—It dissolves muriate of silver, even when very dilute, with great readiness" (p. 19).

"*Hyposulphite of Soda.* . . . Muriate of silver newly precipitated dissolves in this salt, when in a somewhat concentrated solution, in large quantity, and almost as readily as sugar in water" (p. 19).

"*Hyposulphite of Strontia.* . . . Like the rest of the hyposulphites, it readily dissolves muriate of silver, and alcohol precipitates it as a sweet syrup" (p. 21).

"*Hyposulphite of Silver.*—Muriate of silver, newly precipitated, is soluble in all liquid hyposulphites, and, as before observed, in that of soda with great ease and in large quantities. This solution is not accomplished without mutual decomposition, as its intense sweetness proves—a sweetness surpassing that of honey, and diffusing itself over the whole mouth and fauces, without any disagreeable or metallic flavour" (p. 27).

In a second paper on the same subject, which appeared in the same journal, vol i. p. 396, *et seq.*, it is shown (*inter alia*) that the affinity of this acid for silver is such that oxide of silver readily decomposes hyposulphite of soda, and leaves the soda in a caustic state, "the only instance, I believe, yet known of the direct displacement of a fixed alkali, *viâ humidâ*, by a metallic oxide" (p. 397).

"*Hyposulphite of Ammonia and Silver.*—Its sweetness is unmixed with any other flavour, and so intense as to cause pain in the throat . . . . one grain communicates a perceptible sweetness to 30,000 grains of water" (p. 399).

In a third communication, dated November, 1819—"The habitudes of this acid with the oxide of mercury are not less singular than its relation to that of silver."—"The red oxide is readily dissolved by . . . . . hyposulphite of soda, while the alkali is set at liberty in a caustic state," &c , &c.

The very remarkable facts above described I have reason to believe attracted a good deal of attention at the time, and thenceforward the ready solubility of silver salts, usually regarded as insoluble, by the hyposulphites, was familiar to every chemist. It would not, therefore, be surprising if Daguerre tried it to *fix* his plates (*i. e.*, to wash off the iodide coating); but I have been informed, though I cannot cite a printed authority for it, that at first he fixed with ammonia, or with a strong solution of common salt.

For my own part, the use of the hyposulphites was to myself the readiest and most obvious means of procedure, and presented itself at once. My earliest experiments were made in January, 1839, and in my notebook I find:—

"Exp. 1012.—1839, Jan. 29. Experiments tried within the last few days, since hearing of Daguerre's *secret*, and also that Fox Talbot has got something of the same kind." . . . . . . [Here follow some trials of the relative sensitiveness of the nitrate, carbonate, acetate, and muriate of silver. I should observe that at that time I did not even know what kind of pictures Daguerre had produced. This process was not revealed till August, 1839.]

"Exp. 1013.—Daguerre's process—attempt to imitate. Requisites—1st, very susceptible paper—2nd, very perfect camera—3rd, means of arresting further action. Tried hyposulphite of soda to arrest the action of light by washing away all the chloride of silver or other silvering salt—succeeds perfectly. Papers half acted on, half guarded from the light by covering with pasteboard, were withdrawn from sunshine, sponged over with hyposulphite, then washed in pure water, dried, and again exposed. The darkened half remained dark, the white half white, after any exposure, as if they had been painted with sepia."

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* The statement in question, together with some interesting remarks by Mr. Brothers, is just issued in the Proceedings of the Manchester Literary and Philosophical Society.

"Jan. 30, 1839.—Formed image of telescope, with the aplanatic lens . . . . and placed in focus paper with carbonate of silver. An image was formed in white on a sepia-coloured ground . . . . which bore washing with hyposulphite of soda, and was then no longer alterable by light. Thus Daguerre's problem is so far solved," &c. &c.

"Exp. 1014.—Jan. 30. Tried transfer of print and copper-plate engraved letters," &c. &c.

The publication of Daguerre's process (according to Dr. Monckhoven, for I cannot refer at present to the original document) took place on the 19th August, 1839. My early experiments, printed in the notices of the Proceedings of the Royal Society of March 14, 1839, in which occurs this passage in the abstract of a paper read to the Society:—

"Confining his attention in the present notice to the employment of chloride of silver, the author enquires into the method by which the blackened traces can be preserved, which may be effected, he observes, by the application of any liquid capable of dissolving and washing off the unchanged chloride, but leaving the reduced oxide of silver untouched. These conditions are best fulfilled by the liquid hyposulphites."

"Twenty-three specimens of photographs made by Sir J. Herschel accompany his paper—one a sketch of his telescope at Slough, fixed from its image in a lens."

This is the image above mentioned as having been taken on Jan. 30, 1839, and was, I believe, the first picture ever fixed from an optical image ever taken in this country; at least, I have heard of none earlier.

At the time of making these experiments, as already mentioned, I had no knowledge of M. Daguerre's process, further than the mention of the existence of *a process* (a secret one) in a note from Admiral (then Captain) Beaufort, some time about Jan. 23, 1839. Of course I used *paper*, not silver—and it was not a *suggestion*, but a regular and uniform *practice*, to use the hyposulphite; I never used anything else.—I am, Sir, your obedient servant,

J. F. W. Herschel.

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RAPID ALBUMEN PROCESS.

BY ALFRED KEENE.

In my former communication, page 209-10, I referred to an albumen process requiring the same exposure only as the wet, and promised to send particulars when I had completed experiments then commenced, and which I hoped would throw sufficient light upon its peculiarities to enable it to be practised with the same certainty of success as the "Rapid" process there given.

My expectations have not been so completely fulfilled as I had anticipated, and there are yet to be ascertained the particular conditions necessary for ensuring that certainty which is essential for general purposes; but as its extreme sensitiveness will, for special objects, more than counterbalance the care and skill required, I send the best ascertained plan of proceeding.

Bath.—Sixty grains of nitrate of silver, half a drop of nitric acid, 1 oz. of distilled water, to be saturated with bromide of silver in the same way as the ordinary bath is with iodide.

Bromized collodion, containing 3 or 4 grains of pyroxyline, and 10 or 12 grains of a bromide salt in each ounce.

India-rubber solution.—Coat the plate with india-rubber, dry, and coat with the bromized collodion; when well set, immerse in the bath for ten minutes, transfer to a dish of distilled water, while a second plate is coated and excited; wash in two or three changes of hard water, or water containing a little carbonate of soda, place for a short time in a weak solution of bromide of potassium (3 or 4 grains to the ounce), wash back and front, apply the prepared albumen (see ante, page 210), again wash in two or three changes of common water, finally flush with distilled water, drain and dry as evenly and quickly as possible.

Expose about the same time as a wet plate.

Develop with solutions 3, 4, and 5 (see ante, page 210), in the manner there recommended, and intensify by adding a few drops of No. 6, composed of—

Bromide of potassium	3 grains
Carbonate of ammonia	32 grains
Distilled water	1 ounce,

increasing or diminishing the quantity as may be necessary.

Much care and attention are requisite during developing to avoid fog on the one hand, and unduly retarding development on the other. The bromide solution, No. 5, acts in the same manner in the alkaline developer as acetic or citric acid does in the ordinary developer, its restraining influence being very powerful. It is always well to commence developing with equal parts of solutions 3 and 4 with one drop of No. 5 added to each drachm. Closely observe its effect, and act accordingly. If the picture is a long time making its appearance, and develops very slowly, change the developer for equal parts of solutions 3 and 4 only; but if it quickly flashes out, and shows a disposition to fog, immediately wash off the developer and apply distilled water containing a drop or two of No. 5 solution in each drachm. Wash and again apply developer No. 5, increasing or decreasing the quantity as required; and, when sufficiently developed, intensify, if necessary, by adding No. 6.

The progress of fog may be thus prevented, even with an over-exposed plate; but if it is allowed to make its appearance, no future addition of No. 5 will check it. The retarding influence of No. 5 is very great, so it must not be used more freely than is absolutely necessary. Any amount of intensity may be obtained by the addition of No. 6.

When the plates have been properly prepared, exposed, and developed, the negatives are brilliant and clean as those by the wet process, and perfectly free from granular deposit.

I have found slightly increased sensitiveness produced by using, for the preservative, equal parts of a 10-grain solution of tannin and prepared albumen, but the two require mixing just before being used, as the tannin is quickly decomposed by the ammonia.

It will be readily perceived that I am largely indebted to the investigations of others for the general principles of this process, but the details are the result of my own experiments.

It must not be thought that, in introducing it, I prefer it to the one published a fortnight since (Photographic News, page 209); for special purposes, where sensitiveness is essential, it will be found very valuable, but for general use it is not to be compared with the other, which I believe unequalled in the combined qualities that constitute a perfect dry process.

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A FEW WORDS ON DRY PLATES.

BY SAMUEL FRY.

Two events at the present moment seem to offer an excuse for a little further ventilation of dry plate photography. First, then, there is manifestly a resurrection of interest in it: a long period of inaction has come to an end. And secondly, the country has once again put on that dress of summer in which photographers, of all men, delight.

> "Now is the winter of our discontent made glorious summer."

I believe I do but speak the sentiments of a large number when I hail again the Fothergill process. In the years 1859 and 1860, I devoted a great deal of time and scores of plates to it, and came to the conclusion that it was the nearest approach to a dead certainty that the art can boast of. It was of this process that an old friend of mine, an enthusiastic amateur, once said, "The pleasure of photography is gone; I have no failures." As it is simple in an extreme degree in preparation, so are the results excellent. No extra apparatus is required for preparing the plates, and the development is very rapid and easy. In the modified form, involving addition of silver to the albumen, great advantages are found in sensitiveness, and the development is equally advanced by the use of plain pyrogallic. In the pocket may be carried enough concentrated developer for one hundred 10 by 8 plates.

This process has no special disease, like blisters in the collodio-albumen, or those to which tannin plates are liable. No cutaneous afflictions seem hereditary to it. But there are certain needful precautions which should be taken, certain matters on which we ought to have a very clear understanding before starting, and with your permission I will occupy a few lines of your valuable space in calling attention to them. In the first place, with regard to the matter of exposure. It must never be forgotten that a larger number of good pictures will in all probability be obtained with a long than with a short exposure. The same prevails in portraiture. If your light allows you to work in two seconds, and you give three, the picture is exposed half as long again as it should be, and probably much injured; but if you put in a stop, and increase the time of exposure to ten seconds or fifteen seconds, we then find a difference of one or two either way of little moment. Just so is it in out-of-doors work: when you go beyond the quasi-instantaneous, you at once lose the peculiar characteristics of instantaneity, and may as well give a longer exposure, except as a mere matter of personal convenience. Photographers are something like cooks, some of whom are said to have a light and others a heavy hand; one makes her dishes insipid, another dashes in cayenne or other condiments with a vengeance. Thus are photographers about exposure: one has an inclination to give too long, another too short. With the most sensitive Fothergill plates, portraits are easily taken in twenty to thirty seconds in the glass-room, and with a quick carte lens out of doors in still less time. I recommend photographers to accustom themselves to both the quick and the slow methods of preparing plates for use at discretion.

For the quick plates use the mixture of albumen and silver as has been directed, after thorough washing, and finish with a good wash under the tap. For the slower plates give a final wash of gallic acid. These last are admirable for working qualities; they take quite twice as long as the others, but the gallic acid finish seems to communicate very valuable peculiarities. A far greater range of time can be given, with good probability of fine result. When exposing out-of-doors plates requiring these very short exposures, without the opportunity given by wet collodion to develop one to see how it comes out, disappointments will occur. The eye is not an infallible guide for exposure, nor anything approaching it. The varying states of the atmosphere all affect actinism without any cause which the eye can trace. We observe daily differences in the exposures required for portraiture. Although, then, it is very desirable to have the means of preparing very sensitive plates for definite uses, I prefer for ordinary landscape plates, which require four or five minutes' exposure. A far larger number of good pictures are thus obtained than with plates requiring one and a half minutes' exposure.

This is not theory; it is the result of careful observation and examination for many years, and a preservation and comparison of the results obtained by every conceivable variety in the preparation of these plates. It is equally easy, by the methods I have indicated above, to prepare a dry plate to take a portrait in twenty or thirty seconds, and landscape 10 by 8 in one and a half minutes; or one requiring five to seven minutes for a ten by eight landscape; and in order to prevent confusion I will here summarize them.

1st. For a quick plate, sensitize, wash thoroughly (if under a tap all the better), pour on mixture of albumen and silver, wash thoroughly.

2nd. For a plate for landscape or architecture requiring about twice the exposure of the first, the only alteration is to give a final wash of gallic acid.

3rd. For slow plates, with an almost absolute certainty of fine results, if you only give time, over-exposure is comparatively unimportant: use no silver with the albumen, and finish with gallic acid. In each case where gallic acid is used it is not washed off.

There is one final matter about these plates, and I have done. Will they keep, and do they lose sensitiveness?

I know a case where a couple of pure Fothergill plates were forgotten in a dark box over five years; on discovery they were exposed, and were as good as ever. In the absence of a practical actinometer, it is difficult to speak with certainty, but I have a strong impression, and am not alone in the view, that for about twenty-four hours after preparation the plate is in its most exalted state of sensitiveness; a slight degradation, in my opinion, then takes place, but no subsequent change. This refers more to the pure Fothergill, for whether the plates prepared with albumen and silver have equal keeping properties can only be determined by time. After a month I find them apparently uninjured, and retaining all their qualities as at first.

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LITHO-PHOTOGRAPHY.

BY E. BULLOCK.*

A process of litho-photography, as its name implies, consists in the printing of photographs by means of lithography, thus bringing the beauty and truthfulness of photography into a very much wider field of commercial importance and practical value. All who have hitherto experimented in litho-photography have had to confess their inability to overcome that great obstacle to success, the perfection of half-tone; and when we consider the difficulty implied in changing the character of a photograph to that of a lithograph—how, to attempt it, chemicals and operations essentially differing from all ordinary photography have to be adopted—we need not wonder that so few, comparatively, have turned their attention to the solution of this most difficult of problems; rather have we occasion for surprise that so many have diligently occupied their time and spent their money in so discouraging a pursuit. Still, if the great value of a process capable of giving unquestionable durability and unlimited power of production is taken into account, we think the prize is more than equal to the labour necessary to its acquisition. What has hitherto been the barrier to photography illustrating books, catalogues of machinery and designs, &c.? Has it not been the comparatively great expense of photographic productions, and the impossibility of guaranteeing their continued excellence and durability? Therefore any process uniting cheapness with durability can scarcely be estimated too highly, and more especially a process which should combine the wondrous capabilities of lithography with those of photography. The means by which the pictures before you have been produced claim the merits of simplicity and certainty; and though no litho-photograph will ever fully equal a silver print, because of the grain or stipple by which it is composed, we think that for purity of blacks, gradation of shadow, and minuteness of detail, the specimens leave little to be desired. The methods employed have been elsewhere described, and no doubt are familiar to most here. In one instance, we granulate or reticulate the negative by copying a negative with a piece of ground-glass, or, a negative copy of a reticulated surface on glass in contact with it, thus producing a reticulated transparency, from which we take a negative, by again copying or printing, which has for its half-tones a number of lines or specks, an aggregation of which form the pure blacks of the picture. With this negative we print on transfer paper made by coating with either gelatine, gum, isinglass, or other substances of a like nature, any ordinary paper in connexion with bichromate of potash, afterwards inking the surface all over with transfer ink, then placing in water, which dissolves away those parts unaffected with light, leaving the picture in transfer ink ready to lay upon the stone.

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* Read before the South London Photographic Society, May 10, 1866.

The other method we employ is, to imprint upon paper prepared with a gelatinous surface a number of fine specks or lines crossed in different directions (this paper will keep any length of time, simply requiring, previous to using, a coating of bichromate of potash); after exposure under a negative, we treat it in the same manner as in the former instance. We intend supplying this paper to our licensees, thus placing it in the power of all to get a transfer ready to lay on stone with scarcely more trouble than is required in the production of an ordinary silver print.

In the pictures now exhibited you have the earliest specimens, produced under all the inconveniences attached to the experimental working of any process in its infancy, printed by an ordinary lithographer in a country town, without the slightest touch of the artist, having no accompaniment of rich and gorgeous chromo-colouring, and still, under all these disadvantageous circumstances, not utterly devoid of merit, either as specimens of a new process, or as pictures claiming a position only a little inferior to that of photography. If, under such circumstances, results of so high a character are attainable, what may not be expected when, added to continued experience, we have all the improved appliances, together with the most skilled labour, at our disposal, thus combining the highest characteristics of plain or chromo-lithography to the nameless beauty and perfection of photography.

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ON A METHOD OF REMOVING THE LAST TRACES OF HYPOSULPHITES FROM POSITIVE PRINTS.

BY DR. ROBERT ANGUS SMITH, F.R.S., ETC., ETC.

[The following communication, in the form of a letter to the Secretary, Mr. Clark, was read at the last meeting of the Photographic Society of Scotland, May 8th.]

"My Dear Sir,—The announcement which I find has been made of a communication by me to the Photographic Society of Scotland is in such a form as to promise a little more care than I am able to give. I have not been at home for ten days, and in such cases most people find some difficulties in writing; in my case, one or two points that might have been interesting cannot be reached.

"Considering that the cause of the destruction of photographs, apparently by the action of time only, was in reality caused by the amount of hyposulphite remaining in the paper, Dr. Reissig, of Darmstadt, contrived a mode of washing it out by centrifugal force. For indicating the presence of sulphur acids he used a small galvanic arrangement with one cell, and decomposing the acid, had the sulphur thrown on a piece of polished silver, which became readily blackened in the solution.

"Dr. Theodore Reissig, my assistant, examined several faded photographs for me by his brother's method, which, however, appeared unnecessarily delicate, as it was found that the amount of sulphur was very large, and roughly, we thought, in proportion to the amount of decay. I did not determine how much was hyposulphite and how much sulphate.

"As I had been interesting myself in bringing into use some of the remarkable properties of peroxide of hydrogen in oxidizing metals and organic bodies in fluids, it seemed to me that we might readily use it for oxidizing the hyposulphites. I am supposing that the sulphate alone will not be injurious

"The peroxide of hydrogen has been little known to chemists, and even now it is seldom obtained in its pure state. It is, however, to be had in solution, and in a state sufficiently strong for many important purposes in analysis. Oxides, such as in the case of manganese, which will not fall till more highly oxidized, are with advantage treated by it. The lower oxide may remain unobserved in a solution, and in a state of minuteness sufficient to keep it in suspension, but at the moment of contact with the peroxide of hydrogen, it blackens and falls. I intend to speak of this in another paper.

"When we pour the peroxide into a solution of hyposulphite, we do not observe the change, as there is no coloured oxide to be formed; but when afterwards we add a salt of barium, we find that sulphuric acid has taken the place of hyposulphurous. The strength of the solution does not require to be great. That which is sold contains, I think, nine volumes of available oxygen. If we dilute this a thousand times, we obtain a solution capable of oxidizing hyposulphite. It seems to me that all the hyposulphurous acid is converted, and instantly.

"Peroxide of hydrogen is in reality an oxide of water; when the oxygen leaves it to do its work we have nothing but water left; we add nothing to be washed out. It may even happen that it will be of no consequence if we leave a considerable amount of sulphate in the paper, in which case the washing may be reduced to a still smaller amount, and the oxidation by peroxide takes its place. I have been speaking, however, on the supposition that the washing will be continued, and that the peroxide will be used to remove the last traces only of hyposulphite.

"The peroxide as sold contains a little acid (sulphuric): when made alkaline it does not keep so well. If a drop is put upon a photograph it slowly bleaches, but very slowly; still I do not propose its use in this undiluted state, but extremely weak. Again, if the peroxide as sold is neutralized, the bleaching does not take place at least in an hour, an ample time; I have not tried longer, so far as I remember. For neutralization, soda was used. In the extremely dilute state this neutralization would be less needful, if at all so.

"I am not a practical photographer, and hope I shall be pardoned if I say anything which will appear to contradict the experience of those who know the subject well. I had rather hoped that you would take up the subject when last year I spoke to you of the peroxide of hydrogen; and if I send a bare statement, it is because it would be inconvenient for me to work the process until I learned all its peculiarities, and impossible for me to do so as well as one with your skill. I hope you will bring this forward only as a slight idea, which, however, may not be found unworthy of attention.—Yours sincerely, "R. Angus Smith.

"*William Clark, Esq.*"

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THE PARTICULAR KIND OF ART STUDY TO WHICH PHOTOGRAPHERS SHOULD GIVE THEIR ATTENTION.

BY EDWIN COCKING.*

The subject which I am to bring forward for your consideration is one upon the importance of which all, no doubt, are perfectly agreed; but the differences of opinion which prevail regarding the actual work to be done must ever vary with the *stand-point* from which each individual thinker takes his particular view, and therefore it may be that even the remarks I myself am about to make may not have much in them absolutely new, but simply that which others already know, only that in passing through my mind they become coloured with my own particular individuality.

Well, then, before proceeding to offer any views respecting my subject—viz., "The particular kind of Art Study to which Photographers should give their attention"—it must follow, as a consequence, that I should, first of all, show the stand-point from which I take my view; and, for the sake of more clearly keeping that view constantly before me, I propose to myself two sections for consideration, viz., "What photography *cannot* do," and "What photography *can* do," and then afterwards the "Art Study founded upon those considerations."

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* Read before the South London Photographic Society, May 10th.

Being an artist of some years' experience, and having accustomed myself to analyse and consider both the mental and manual mode of operation by which the finished work of the artist is produced, I bring the same study to bear upon photography, and I must confess that I cannot agree with the assertions so frequently made at the present time, that photography does, and will more so, rank as a Fine Art. Now, all works of art may be placed under two classes—the subjective and the objective. The subjective is that mode wherein the conception of artistic ideas, and the conveyance of the same to others by the representation of visible objects, become, so to speak, emanations of the particular mental character, sentiment, and feeling of the producer, and are stamped upon the *materials* used in this representation, so that, although physical, they become a part of the spiritual, and, thus combined, constitute what I understand to be Fine Art.

The objective mode is that wherein the representation is simply a reflex of the visible object as it appears to everybody, without partaking of any infusion of mental characteristics into the materials.

Now, whether the produce be an "artist," a "sculptor," a "musician," &c., the same result follows in each case.

I will give an illustration of the subjective mode of treatment in its simplest conditions.

Some years since, when I was a student of the Royal Academy, "Etty" was living, and he attended every evening in the life school, and whilst it was our aim to imitate the model in the objective mode, Etty produced a work which, besides being like the original in its objective form, bore all the impress of his individual mode of artistic feeling, and the result was the production by him of a subjective study, which became in reality a Fine Art picture, full of great beauty.

My illustration of the objective mode I will take from the Art of Music. I have heard an elaborate piece of music played by a self-acting instrument, where every note was perfectly in tune, the modulation of harmony most correct, and the piano and forte gradually melting one into the other—a magnificent specimen of the objective in art—but there was wanting that emanation of mind and feeling acting upon the materials, and so the result was not Fine Art.

Now, let me apply these conditions to photography, and looking at all the various scientific appliances brought to produce a result. I cannot but think that as there is but little of a plastic nature in these materials, photography cannot be said to belong to the subjective class of art.

Without in the slightest degree unduly exalting the mere materials of the artist, it must, I think, be evident, that these very materials can be the only possible medium by which, and through which the subjective mode of action can be realized. It must, then, undoubtedly be the subjection of these inanimate materials to the will of the artist which constitute the visible ideas and individualities of his creative power.

Thus much I have stated to support my position, "What photography cannot do."

I have now to consider "What photography can do;" and the objective mode of art, appears by the aid of photography to be carried almost to a state of perfection. I say *almost*, for it must be evident that as the progress of photography depends so intimately upon the researches and discoveries of science, we must not say perfection is reached, when we know not what science has reserved in store for us in the future.

The marvellous power of photography, then, consists in its capability of reproducing whatever is visible; but this power, which is its greatest stronghold, is also very frequently its greatest enemy, for both good and bad, the beautiful and the ugly, are rendered with the same amount of positive truthfulness. So far, then, as the production goes—viz., a picture in black and white—it leaves the objective student in art far behind.

But now comes into view another and higher element of capability, its rapid mode of action; and this allows of the visible object being taken at its most favourable moment, as also of the human object being forced out of its normal condition and made to assume another phase of aspect; and it is in the selection and arrangement of objects for this special capability where can be brought into operation and made evident cultivated taste and appreciation of the beautiful. Now this is "what photography can do," but it is because of the existence of this capability and the results arising therefrom, which has led so many to desire the immediate elevation of photography to the aristocracy of fine art.

I may sum up this portion of my consideration, by saying, that in fine art, the impression of the object goes through the eye into the mind, and after having been clothed with the peculiar sentiment of the artist, becomes visible in a new dress, through the direct agency of the hand; whilst in photography, whatever amount of sentiment can be infused, goes from the mind through the eye to be worked out upon the object, and the result is afterwards left to scientific means to be made visible.

And now, I arrive at my proper consideration—the Art Study, founded upon the foregoing, and which may be generalized as "expression;" and this has its motive power in the existence of "sympathy."

The question then arises, In what way is the photographic student to study, and work out this power? Now, although the objective mode of study pursued for some time by the artist is gradually teaching and expanding the mind to appreciate and lay hold of whatever can be made expressive in fine art, such a course is hardly desirable for the photographer, who has not the power of impressing upon his work any mental character through manual agency. There is then no necessary occasion for him to acquire any artistic manipulative skill; and in fact, the time which must be given up solely to educating the hand would deter many who find that, by comparison, photographic manipulation is so easy.

So that, instead of manual, it must be mental work; and as the eye is the sole directing agent, all improvement must proceed through the cultivation of that sense, and therefore I would not lay much stress upon the mere reading of books on art, which lay down abstruse rules, containing much theory with little practice.

I would rather suggest the study of the various engraved works extant, especial choice being made of those which translate the subjective mode of art. Outlines, especially, I would recommend to be examined, and an endeavour made, first of all, to ask oneself what impression is made upon the mind by the varieties of position and juxta-position of simple and combined lines of form. Some of the German outlines contain many beautiful examples of the various positions of expression, in which those most difficult members, the hands, may be placed. By a careful study of this kind, in time the mental perceptions would become assimilated with the invention of the composer, and then, by endeavouring to carry out in practice, by arranging the object so as to reflect back the same emotions; and although existing then as a consequence, when photographed they would become a cause of similar emotions to the beholder.

It is of course evident that I have in view the general practice of photography, which includes so much of portraiture. I take it that every person who presents himself to be photographed has his own individual expressiveness distinctly evident, but the difficulty lies in being able to read it at once. Now if the student in the expression of form has made sufficient progress, he will sympathise with the object presented to him, whether it belong to either the simple, the beautiful, or the grand, and will then proceed to alter the normal position, and so enlarge and refine upon the same, that whilst it retains its own individuality, it has assumed a higher phase of the same expression. This alone is a peculiar matter to carry out, for when the fine art student has commenced to imitate his model, he has it in his power to alter any part without any corresponding change in the object, whilst the photographic student is compelled by that despotic autocrat, "the lens," to produce anything and everything that comes within its vision.

The next study will be that of light and shade in its highest capabilities of expression; but this requires a much more advanced artistic perception; and here the engravings from the works of Sir Joshua Reynolds, Vandyke, and others would be of great use.

I may also again here refer to the Royal Academy, who have in their library a very choice collection of engravings, and in my time the greater portion of the students were studying them, whilst books of rules were comparatively little used.

But still the practical question arises, how is all this to be done? One way would be for some local society to become possessors of such works, and put them in circulation throughout the mass of photographers. My opinion is, that more good would arise from this plan than the formation of any book club.

And intimately connected with my subject is the moral element, which, although not pictorial art, is nevertheless an art; it is the influencing of the facial expression, and in its highest meaning: here comes into play the motive power—sympathy. The photographer should endeavour to read and sympathise with the mental characteristics of every model, as to adapt his manner, his tone of voice, and his choice of words, to influence their minds for the moment. And whilst I am away from the main subject, I must take leave to allude to another matter. I have had occasion to come into contact with numerous photographers throughout the country, and I have noticed the tendency of some to acquire what I cannot help calling a large amount of conceit, and also to look down upon the educated artist. This arises from the impression made upon their minds in deriving so much satisfaction from the successful rendering of some object, comprising in itself some large amount of exquisite detail which the fine-art student would despair of being able to imitate. Now this state of mind arises from so much being done by so little means, whilst that work of the artist which consumes most time, exerts most intellect, and on which is devoted most labour, is not apparent or superficial. Now those who indulge in this feeling will never see beyond a mere mechanical production; but if once they can be made to see that there is something higher and more worthy than mere imitation, study and observation will soon raise them. They are somewhat in the position of an observer on the sea-shore, who, because he can see the full extent of the horizon, fancies he sees quite as much as another who is on the top of some high cliff, forgetting that the higher he climbs the greater amount of area there will come into view.

I would wish the present and future photographer to cultivate as much as possible an acquaintance with the great works of fine art, and an endeavour to sympathise with what is good and beautiful in nature. There are already some who have shown how that the practice of photography has brought out latent and correct feeling for art, and who have endeavoured successfully to infuse this spirit into their productions. These are the men who *think*, and that is one reason of the success of this Society, which more especially considers art in relation to photography, that the fact of becoming a member implies a foregone conclusion that he is a thinking man already.

I have thus only just indicated, in faint outline, some few notions, and I regret that since I commenced this paper my time has been occupied professionally, that I have not been able to carry it out still further in detail.

In conclusion, I will only say that I think it unwise to attempt to enrol photography under the banner of fine art, for it possesses in itself so much that is totally distinct from, and out of the power of, fine art to accomplish, that I would prefer whatever is great and good in our art-science to be judged from an independent position altogether. Photography will go on increasing more and more in power, more especially in its ministrations to human affections, its universal application to almost all the sciences, and in its giving employment to commercial enterprise; and whilst I cannot rank photography as a fine art, I can claim for it a speciality beyond anything else ever yet attempted, its power of truth; and by its aid we may attempt the recording of many phases of nature and of human life, which otherwise would never have had a "local habitation or a name."

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POISONING BY CYANIDE.

The following letter and editorial comment, which appear in our excellent contemporary, *Humphrey's Journal*, will interest many of our readers:—

"*Columbus City, Iowa, March* 30, 1866.

"Dear Sir,—In your Journal of April 1, 1865, you published my account of being poisoned by cyanide, &c. I will now give you the result of the case, and, if you think it will interest your readers, you are at liberty to lay it before them.

"I am nearly recovered from the effects of the poison; there is yet slight remains of paralysis in the face, but nothing that is troublesome. The means I have used are total abstinence from the use of cyanide; extreme caution in the use of all poisonous chemicals; and, finally, several months' absence from the photographic rooms. In fact, I have endeavoured to give nature a fair chance, and the result is almost a cure, with a prospect of its being complete.

"I have talked with several able physicians in regard to my case, but I have found no one who seemed to understand it clearly; but I have lately found something which seems to make it much plainer to me. An author that I was reading mentions inflammation of the parotid gland among the causes that may produce paralysis of the seventh nerve. It occurred to me that that was my case exactly. Swelling of the side of the face and salivation preceded the paralysis that followed; it now seems to me as the consequence of the swelling.

"My whole nervous system was deranged to some extent before that time, and quite seriously for some months after. I call it a state of semi-paralysis. I found whenever I sat with legs crossed, or my arms resting on a chair-back, or lay with my arms under my head, a numb and tingling sensation happened universally, and so severe that I had to avoid such positions entirely. This condition, I think, was caused by cyanide of potassium absorbed into the circulation. I do not know that cyanide could cause the salivation and swelling of the gland; but I think iodine might, and it had the same chance to be absorbed, as I was using it freely in intensifying, and I confess to much carelessness in handling all chemicals, until I learned this severe lesson. I was not using mercury in any form at that time, so I charge nothing to that source. My theory of the case is, that a swelling of the parotid gland, pressing upon a nerve already partially paralyzed, or in some way deranged, completed its paralysis.

"My case has been a puzzle to all medical men and photographers that I have conversed with on the subject; and if there are any facts or experiences that go either to confirm or destroy my theory, I would like to see them made public, as there can be nothing more important to photographers than a knowledge of the effects of the articles they use upon the system. An investigation of that subject might be profitable.—Respectfully yours, G. L. Thomas."

Answer.—Supposing the swelling of the parotid gland could or did paralyze the *portio dura* of the seventh pair of nerves, the results of this paralysis would be felt only in those parts to which this nerve is distributed; that is, in the head, face, and neck. This paralysis, however, would be, according to your supposition, not the effect of cyanide of potassium, but of the swelling of the parotid gland, which remains to be accounted for. We do not think that either cyanide of potassium or iodide of potassium has been the cause of your indisposition, and we venture to insinuate there is some scrofulous diathesis in your constitution which has been the main cause of your trouble. However poisonous an ingredient cyanide of potassium may be, if absorbed it is not long retained in the system; for healthy nature possesses a very powerful machine (in the circulatory system of the blood) to get rid of all such toxical or effete matter. Of course, we cannot be positive in any opinion as to the cause of your ailment, not being conversant with all the circumstances; but we are positive of this, your theory is altogether untenable. You or any photographer can avoid in future any risk of being poisoned by using the Chinese Solvent for cleaning your hands instead of cyanide of potassium. You can get it of any stock dealer.—Eds. H. J.

Proceedings of Societies.

South London Photographic Society.

The usual Monthly Meeting of this Society was held in the City of London College on the evening of Thursday, May 10th; the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a former meeting having been read and confirmed, Mr. A. Bedford and Mr. W. G. Hunter were proposed and elected members of the Society.

The Chairman called attention to some exquisite pictures by Mr. Robinson, sent by Mr. Dallmeyer to illustrate the working of his new portrait triple lens. The pictures received universal admiration, and were frequently referred to, in the course of the succeeding discussion, as illustrating the art capabilities of photography.

Mr. E. Bullock then read a paper on Litho-photography (see p. 232), and exhibited some fine illustrations of the process.

The Chairman, in proposing a vote of thanks, spoke in high terms of the excellency of the examples exhibited.

An animated discussion on the possibility of retouching the photographic image, either on the stone or the transfer, with a view to give finish when necessary, followed, in which Messrs. Cocking, Howard, Blanchard, Bockett, Bullock, Simpson, and the Chairman took part.

Mr. Bullock said that they had practically ascertained that this could be done, and would be happy, on a future occasion, to show some examples. It must be borne in mind that but very little retouching was required where a good transfer from a good negative was effected.

Mr. E. Cocking then read a paper on the "Particular Kind of Art Study to which Photographers should give their Attention" (see p. 233).

The Chairman, in proposing a vote of thanks, and expressing his approval generally of the paper, said he thought, however, that much of the limitation as to art status which the writer had attached to the camera, belonged equally to the pencil of the artist. The painter might, on the one hand, be a mere mechanical copyist, whilst, on the other hand, with such a picture as this (holding up one of Mr. Robinson's photographs), before him, he (the speaker) could not but feel that the photographer might be an artist, and his results real works of art. This Society had always endeavoured to maintain and exalt the art status of photography, and he could not but think that it was better to hold a high rather than a low conception of the capabilities of the art; and indeed, he might add, that he had seen some of Mr. Cocking's own productions which fully maintained the art power of photography.

Mr. Wharton Simpson said he had listened with much pleasure to Mr. Cocking's excellent paper, and felt indebted, in common with every one present, to him for one of the most thoughtful and valuable papers they had had for some time. Agreeing with much that Mr. Cocking had said, however, he must still take exceptions to some of his positions. He was quite prepared to agree with him in admitting that photography was not a fine art, *per se*; but neither was painting. In the hands of an artist, painting might produce works of fine art; and in the hands of an artist, photography might produce works of fine art. Although he by no means affirmed that photography was as plastic in the hands of the artist as painting, and although as all who had striven after art by photographic means well knew, it was more limited in its capacity than painting, yet it was not bounded by the same mechanical conditions as a piece of music produced by a barrel organ. Whilst photography might, in a certain sense, be called objective, because it was bound to render facts as they are, and painting might be called subjective, inasmuch as it could render facts as the artist saw or conceived them, yet photography went further than this, and the materials possessed sufficient plasticity to enable each photographer to stamp his own individuality on his productions. It was well known that all the most celebrated photographers had each his manner, as much as artists had; and those who were familiar with their work could say, without hesitation, this is Robinson's work, that Mudd's, that Williams's, and that Bedford's. Putting aside all the undoubted artistic faculty which the photographer had to exercise in the selection, lighting, and arranging of his objects, he had no hesitation in saying that if a dozen photographers were placed before a view or a sitter, in which these preliminary matters were all settled, still they would produce twelve different pictures with perhaps as many gradations of excellence. In the developing alone there was much plasticity in the materials, and considerable artistic control was possible. In the picture he held in his hand, Mr. Robinson had so developed that he produced the texture of flesh: he might have so developed that he should have produced the texture of chalk. Again, with the same model, apart from the difference of costume, Mr. Robinson had produced entire difference of character and individuality, in the various pictures, stamping on the picture the conception of his mind, rather than the inherent or objective characteristics of the model. There was some little difficulty in the question of terminology. Photography could not produce works of ideal art, and there seemed an incongruity in classing photographs in the same category as the works of Michael Angelo and other great masters; but the same incongruity existed when bad or puerile paintings were so classed with works of genius. It seemed to him that making a distinction between the terms fine art and high art would, to some extent, meet the difficulty. The latter would include works of imagination and genius, all that belonged to creative art; whilst by fine art would be expressed all works by which cultivated taste and skill, exercised as imitative art, produced beautiful pictures or objects. Notwithstanding, however, that he had somewhat differed from Mr. Cocking in terms, he thought it was probable they agreed in fact. The foolishly sweeping art claims made by some for photography placed it in a false position, and they then judged it by an unfair standard; hence the nonsense which had been talked of late by some on the subject of art in connection with photography.

Mr. Blanchard remarked, in endorsing the remarks of Mr. Simpson, that photographers could at least aim at that which painters aimed, namely, in depicting nature, to secure the greatest number of beauties. Hence the value of art education. The educated eye saw beauties which, to the uneducated eye, were invisible. Himself a lover of nature, and admiring natural beauties, he had been struck with the new beauties pointed out, during a walk, by a cultivated botanist, which he himself, with all the disposition to admire, would never have seen until they were pointed out. The cultivated painter could see further and clearer than one with no art knowledge, and hence could depict more of beauty, not because he created it, but because it existed, and he could see it. The highest art was that in which the greatest number of the beauties of nature were the most perfectly rendered; and he claimed high ground for photography, when practised by a cultivated artist, in this very particular. Artistic culture would enable him, in looking at a scene, to know whether it would make a picture best in sun or shade, in summer or winter, or under all the other possibly varying circumstances. He might mention an illustration in connection with subject pictures. The Society had chosen his "Zealot" for their presentation print, and it had been praised for the vivid expression it contained of the Zealot's character; and yet this appearance of intensity and burning zeal in no way belonged to the model, who was—quiet, amiable, inoffensive man—chiefly distinguished by being an excellent nurse to his baby. The character in the picture was entirely the work of photography and the photographer.

The Chairman said he thought the paper was a valuable one, in pointing out that the photographer did not require the same kind of education which the painter did, such as a study of anatomy, &c. The kind of education he required was the education of the eye, which would enable him to know good art when he saw it, and would induce him to confer as much of art qualities on his work as it was capable of. A knowledge of what was good and what was bad in art was essential, of course, to the production of good effects in photography, and it must be admitted that it was in so far plastic that the artist could produce good or bad effects by its aid, just in proportion to his knowledge and taste. The charming effect of sunlight on the figure which he held in his hand was managed by Mr. Robinson so as to produce one of the most beautiful pictures he had ever seen. A less skilled or educated artist would perhaps have allowed the sunlight to make a patch on the nose, or given an effect of grey hair.

Mr. **Sebastian Davis** said that when we clearly understood the extent and nature of the power we possessed, we could the better apply that power. The photographer could not, by his art, embody a creation of the mind; whilst the painter, by his art, could. Nevertheless, photography possessed power of another kind to give embodiment to works of art. It could accurately depict those rapidly passing effects of nature which could not be faithfully registered by any other means. In considering the art capabilities of photography, he had always been disposed to insist on the importance of instantaneous photography; he believed that much of the future of art photography depended on instantaneous photography, and thus, even by the improvement of optical appliances and chemical processes, some of the highest artistic results were to be anticipated.

Mr. **W. Warwick King** said that he thought one great obstacle to the progress of art photography consisted in the craving after pictures of large size. He agreed with Mr. Davis on the importance of instantaneous pictures. He remembered that a good few years ago Mr. Lake Price remarked that to instantaneous effects we must look for artistic pictures; and he remarked at the time on the beauty of the engraved pictures of Turner, which were all small ones. He hoped photographers would confine themselves to small pictures. He did not, of course, refer to such pictures as those of Mr. Robinson, on the table, but to large landscapes, which could not, of course, be obtained instantaneously.

Mr. **Simpson** said that there was a limit undoubtedly to the size for which the nature of the gradation, colour, &c., of photography was suited; it would not do for pictures five or ten feet square, for instance; but, as a rule, he scarcely thought the tendency was to produce pictures the size of which interfered with their artistic qualities.

Mr. **Blanchard** thought, on the contary, the great want in this respect was a lens which would produce instantaneous pictures up to a size of 12 inches by 10 inches, and he had strong hope that the same lens which produced the magnificent specimens Mr. Dallmeyer had sent that evening would effect the end in view.

Mr. **Cocking** said that he had been much misunderstood if it was thought that he regarded photography as incapable of producing pictures with artistic qualities. What he had insisted on was, that the capability of photography was different, not only in degree, but in kind, from that of painting. Photography must produce literally that which was placed before the camera, more perfectly, but in the same way, that he had described the students in the life-school copying a model; whilst painting, as represented by Etty, produced, not simply a copy of what was before his eyes, but such a picture as it produced in his mind, the picture partaking rather of the character of his genius than of the mere model before him.

Mr. **Howard** said the great distinction seemed to be in the acknowledged incapacity in photography to produce ideal art; but when real or imitative art was concerned, there was no such incapacity:

An animated but desultory conversation on the subject followed the close of the discussion, in which Mr. Cocking maintained the superiority of painting, even in imitative art, in rendering texture by variety of handling. Mr. Blanchard maintained that all mannerisms were imperfections. Mr. Simpson said that the production of effect by variety of handling, although often very clever, was really an imperfection, and the substitution of a mechanical effect or trick for perfection of drawing such as might be secured in photography. Mr. King, Mr. Cocking, Mr. Davis, and the Chairman also took part in the conversation, at the termination of which the proceedings terminated.

Amateur Photographic Association.

On Friday, May the 4th, a Council Meeting was held at 12, York Place, Portman Square, Col. the Hon. D. F. de Ros in the chair. The minutes of the last meeting having been read and confirmed, the following members were proposed and elected:—

Hon. R. L. Melville; J. Riley, Esq.; Mr. E. Dauherry; Major Munn; W. H. James, Esq.; F. H. Tanner, Esq.; J. C. A. Bones, Esq., M.A.; H. A. Ernuin, Esq.; Viscount Kirkaldie; William Adcock, Esq.; Madame Van de Weyer; Joseph Davies, Esq.; Jno. Rowlatt, Esq.; Miss H. Campbell; Capt. G. Napier, R.A.; W. Hardmau, Esq., F.R.G.S.; John Gibson, Esq.; J. Paget, Esq.; J. F. Tuckett, Esq.: Rev. J. Freke; W. T. Hall, Esq.

Several other matters were brought forward, but in consequence of neither of the Referees having been able to attend, they were deferred until the next meeting of Council.

A. Melhuish, Hon. Sec.

Correspondence.

TANNIN AND HONEY.

Sir,—A communication in the last number of the *British Journal*, signed "Z." on the tannin and honey process, makes use of my name as an authority bearing testimony to the excellence of that process. My first impression on seeing my name so used was one of unbounded surprise, as I well knew that I had never published anything on the subject. A little search, however, enabled me to find the source of the quotation. A leading article in your columns, just four years ago, quotes a passage from a private letter addressed to you, in which I made use of the words quoted.

I am much obliged to "Z." for the importance he appears to attach to my opinion on this subject, but whatever authority my name possesses shall be used, as far as it is in my power, on the side of truth, and to assist rather than retard the labours of my photographic brethren. I musk ask you, therefore, to state that, at the time mentioned, I tried the process originated by Mr. England, and with sufficient success in the first plates exposed to justify, in a private letter to a friend, the statement as to its promise. Further experience, however, convinced me of the utter uncertainty of the process, and, after a fair trial, I abandoned it; Mr. England, I believe, has done the same; and I may add, that the experience of all I know, on whose judgment I can rely, has proved the unsatisfactory nature of the process. Out of the thousands of tannin pictures I have seen, I cannot recall half a dozen that were presentable, and not one which could compare with those by the collodio-albumen process, as worked by Mr. Mudd, or the recent modification worked out by Mr. Gordon. In short, I have a very strong conviction that the introduction of the tannin process has, from the uncertainty and imperfection which characterises the process, materially retarded the progress of dry plate photography.

H. P. Robinson.

THE "REASON WHY" ON SUN-PRINTING IN ANSWER TO THE "PHOTOGRAPHER'S ASSISTANT."

Sir,—In the last number of the Photographic News your able contributor, the "Photographer's Assistant," has made a few observations on my paper on sunlight printing, which seem to me to call for a little explanation. Your contributor says that sunlight printing is "wrong in principle," because, as we are informed, "the perfect negative would yield only a flat and unsatisfactory picture" if printed in sunshine. But what is a "perfect negative?" Is it not one which will yield a print having, as nearly as possible, the gradations, the vigour, and the depth of colouring of the original from which it was taken? I was at some pains to show that, to obtain the best possible gradations in the print, it should be taken in sunlight; and that, therefore, the best possible condition of negative was that which will withstand the action of the direct rays of the sun, as I explained. Surely this cannot be proved to be wrong by the simple assertion that a negative suited to print in bright diffused light will not withstand the full rays of the sun!

Your correspondent next observes that sun printing is impracticable in extensive practice, because, with a large number of frames, there would be a "rare roast." I suppose that the number of frames at work at any given time must always be proportionate to the number of "hands" employed to look after them. I have found that, in bright sunshine, the prints are taken so quickly from a first-class negative, that though one man would certainly use a smaller number of frames, he would get through quite as many prints, if not more, than he would in a less bright light with more frames at work.

The sun but seldom shines in this country for any great length of time together, and this is the great bar to sun printing; but it is to be observed that in my article I was speaking of the *best* and *most perfect* method of securing a certain result—not of the mode in which the greatest number of perfect pictures could be made in a given space of time.

Thirdly, we are informed that sun printing is unnecessary, because "if the conditions needed in toning operations are understood, there need follow" "absolutely no reduction in the hypo." But I may ask, who does understand the "conditions" so as to produce this result? The colour of the general tone may blacken when in the hypo, but in every case which has come under my observation, there has been at the same time a decided loss in the depth of tone, always more observable in and near the high lights.

On comparing a first-rate carbon print with a silver print from the same negative, it will, I think, be easily seen how much more delicacy there is in the tones near the lightest in the carbon print.

One word more, and I have done.

Mr. Bovey says, in the course of his paper, that he can tone with certainty a number of sheets of paper, said by others to be "unprecedented," with a grain of gold. Would it be too much to ask Mr. Boovey if he would give us a paper on the "*reason why*" the number of sheets toned is, in his case, so large; in other words, a paper on the principles involved in the toning of silver prints, and in the complete substitution of the gold for the silver?

The enormous waste of photographs by their fading, the bad tones produced by even professional photographers, and the various formulæ which have been published for toning solutions, &c., go, I think, to show that, as yet, some photographers know little enough about the practice, not to mention the theory, of their art. I am sure a paper on the subject I have just mentioned need only come from the pen of your most able and practical contributor, "The Photographer's Assistant," to be duly appreciated.—Yours truly,

NELSON K. CHERRILL.

The Royal Oak, Borthwaite, Borrowdale.

THE "REASON WHY" OF TONING WITH GOLD AND MAGNESIA.

SIR,—That carbonate of magnesia does play on alkaline "earthly part" in the toning bath is proved practically by several months' good toning; but as the "Photographer's Assistant," though he does not like formulæ, likes to know the "reason why," I will, if you will allow me, try to give it.

The many toning baths that are used do not prove complexity in the changes involved, as nearly all may be explained by one governing principle, which I take to be, that gold is reduced by a silver print in the presence of a substance (usually alkaline) that combines with the chlorine of the gold, which, if left free, produces bleaching and mealiness.

Now carbonate of magnesia dissolves in pure water to the extent (and very little more) that is required to absorb the chlorine of the proportion of gold I mentioned. So the chlorine is provided for, without adding to the bath, as in some formulæ, much that is unnecessary.

With all respect for Mr. Bovey's lengthened experience, I must protest against an acid toning bath as likely to be prejudicial to permanence.

Experimentalists say that one grain of gold should tone seven sheets. In practice the quantity will vary with the amount of light in the pictures.

Magnesia seems to waste very little, if any, of the gold; soda salts render a portion useless by the time the bath is fit for use; the same or worse seems true of lime, except, perhaps, when in the presence of free chlorine.

One thing I have to retract. I recommended that water containing carbonate of lime in carbonic acid should be treated with lime, and then neutralized with hydrochloric acid. This plan is not so good as I at first thought. It is uncertain; sometimes the magnesia remains undissolved, and after some hours assumes a sort of salmon colour; in which case the bath will not work. The change and the cause I have been hitherto unable to account for.

To get good toning in good quantity—and I have usually found they go together—it is imperative that the water of the bath should contain very little carbonate of lime.

Lime gives with gold a light-coloured flocky precipitate, of course useless for toning; its carbonate does the same, though more slowly; the action of the sulphate is, I think, similar, though perhaps in other respects worse; the nitrate and the chloride of calcium seem less injurious. No doubt the great cause of uncertainty in toning is the variation in the salts contained in the water. With many natural waters, a carbonate of soda bath made to Mr. Eliot's formula would contain a sulphate, the carbonic acid going down with lime.

Simple neutralizing, when the water contains a variable amount of salt, is uncertain, and is at any time unsatisfactory, clogging the bath with salts, useless at the best. I have not been able by any mode of doctoring to get with Thames water, as supplied to us, the toning I have been accustomed to; but the first bath made with distilled water toned over seven sheets per grain of chloride of gold rapidly and well.

Having given the "reason why" I use carbonate of magnesia, I shall be happy to hear stronger reasons in favour of any other process, if they can be given.

I have used acetate of magnesia prepared in several different ways, with considerable success.

When water containing lime must be used—and no doubt that is the case with many—the acetate of magnesia is better than the carbonate. If carefully treated, it becomes a sort of subsalt, and combines with carbonic acid in the water, slowly precipitating some of the lime.

Do you know of a good test for magnesia in dilute solution?—Yours truly, ED. SEELEY.

Photographic Notes and Queries.

SUGAR IN THE DEVELOPER.

SIR,—I was glad to see, from your number of the 16th ult., that some one had been found to speak for sugar. I am an old hand with sugar now, for I have used it ever since 1863.

I have lately tried honey, but in this hot climate it has a strong tendency to ferment, and fermenting honey exercises a strong restraining power; so that, finding the state of the same honey produced different results, I have given it up.

I have lately tried sugar with the ammonio-sulphate of iron, and found that 10 grains of the former to 40 of the latter gives a clean picture without acid; but a little glacial acid is desirable here, as without it the solution deposits a sediment.

With acid, five drops to the ounce, holding the proportions I have given of the iron and sugar, the solution keeps well and long—say five or six weeks.

I use alcohol. Why should one not? If sugar be a restrainer, is it not immaterial whether we use it or alcohol? Sugar or acid, beyond what is actually needed in a developer, gives intensity or contrast at the first application, but there is great risk of losing gradation. For instance, in a landscape we lose the distance more, I think, so, than by getting a phantom picture with the smallest amount of restraining material and cautious intensification.

You will gather that my pictures are thin at first. I always use iodine solution, and find its colour quite sufficient. Intensification is readiest, and will go furthest, with a strong solution.

I enclose you a head from nature.—I am, yours faithfully,
India, March 31*st*, 1866. ARACANENSIS.

[The reason for omitting the addition of alcohol to the developer, when sugar is used, is, that the solution being made syrupy or viscous by the sugar, it generally flows in an even, unbroken wave, without the aid of alcohol. The card enclosed is excellent.—ED.]

CABINET PORTRAITS.

SIR,—We have commenced issuing to our customers a cabinet picture 5½ inches by 4 inches, and we find that they give very great satisfaction, and are greatly preferred to the carte-de-visite; as, while they are equally pretty pictures, they are, from their increased size, necessarily better portraits.

We intend publishing portraits in this form; and several of the chief firms in London, with whom we have communicated, have expressed their intention of doing the same, and also of introducing these cabinet pictures as largely as possible among their private customers. Messrs. A. Marion and Co. have undertaken to supply albums suited for them. If, therefore, photographers will adopt an uniform style, size, and title, little difficulty need be apprehended in popularizing a new class of photograph, which cannot fail to be a source of profit.

No especial appliances are needed for the *cabinet* pictures. They are taken on a half-plate, with a 4 B, or 3 B, or a whole-plate lens—and every studio has at least one of these—while other arrangements for cartes-de-visite serve.

With respect to prices, as the cabinet is rather more than double the superficial dimensions of the carte-de-visite, we charge double the price for them; that is—adhering to our usual charges—we give half the number of pictures.

As albums will be made of one sized opening only, for the convenience of photographers we give the exact dimensions:—

Size of picture	5½ in. by 4 in.
„ mounting card, lettered below, as for C.D.V. ...	6½ in. by 4¼ in.
Sight opening in album	5¼ in. by 3⅞ in.

Messrs. A. Marion, Son, and Co. have kindly undertaken to show or furnish specimens of cabinet portraits to photographers desirous of further information.—Yours faithfully,
WINDOW AND BRIDGE.
63A, *Baker Street, Portman Square, W.*

SPOTS ON PRINTS.

SIR,—Seeing, at different times, about spots that appear on the prints while washing, I do not agree with anything I have read on it yet. I have been troubled more than a little before I found the cause of them. On the large spots I have seen a small speck of dirt on moving the print it would move away, but the prints that faced down never suffered, those only that were placed face up. I get my water from a well, and wash my prints in tubs. I have of late had made a cistern, which I fill and let it stand for one or two hours before I draw it off. My tap is three or four inches from the bottom; and since I have never seen either large or small of the kind I used to be so much troubled with.—I am yours truly, J. R.
Padston, May 14*th*, 1866.

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Talk in the Studio.

THE PARIS EXHIBITION OF 1867.—We are authorized to state that the space applied for by English exhibitors amounts in the aggregate to more than 300,000 superficial feet of net horizontal exhibiting space; whilst the amount set aside for them by the Imperial Commission only amounts to 70,000 superficial feet of net space, which is partitioned into groups by the Imperial Commission, thus limiting the powers of the British executive in regard to the space. Local and sub-committees will allot the space to individual applicants, limiting or rejecting the claims made according to their judgment. In regard to English photographers, the Photographic Society of London has been commissioned to consider and arrange the claims for space, &c. We presume that some official notification will shortly reach applicants.

MAGIC PHOTOGRAPHS.—A correspondent says: "Tradesmen might take advantage of the increasing popularity of this sort of thing, and have their business addresses photographed in various fancy and ornamental designs, which they could send round with directions, &c., in the envelope, and the compliments of the individual or firm—so that any sitters or dealers may make themselves at once a magic name in drawing rooms and parlours. This plan would be certain of arresting attention, and calling the public observation to their various claims, where a print or engraved circular, no matter how well executed, would be thrown in the waste paper basket, or the fire. The preparers of Christmas Cards, &c., &c., should also be on the move, as it is a process well adapted for that festive season and mirthful time for young and old.

THE ROYAL ACADEMY.—From a Parliamentary paper, just issued, it seems that the authorities of the Academy accept a site from Government for a larger building, capable of admitting a much larger number of pictures to their annual exhibition. The average number of accepted pictures sent back every year, for want of space, is about 180; and it is to this circumstance, rather than to any narrowness or inefficiency in the Academy, they attribute the absence of cordial feeling in the general body of artists. They decline to increase the number of academicians to fifty, as suggested by the Government. They open the position of associates to an indefinite number, with a minimum of twenty always to be filled up. Engravers in future to be eligible to full honours, either as academicians or associates, instead of the partial recognition hitherto accorded to them. We wonder when photographers will be eligible for recognition! There is an acknowledgment of a certain dependence on processes even amongst painters, for it is also proposed, as soon as space will permit, to have a laboratory and chemist attached to the Academy, to aid them as regards colours and vehicles.

MAGIC PHOTOGRAPHS.—A correspondent says the demand for magic photographs, and the eagerness for drawing-room and parlour *photoprestidigitation*, is decidedly on the increase, both in town and country. One of the best moves out, and which many might follow with advantage, is to copy carte de visite portraits for the persons represented in the pictures, as humanity, as a rule, will feel more anxious and more interest in bringing themselves out with a few drops of water, than strange subjects. One enterprising genius, I see, calls it the new and startling "*aquæmirabilisdodge.*" At the same time, heads of families, and those wishing to make presents, should be cautious, and only procure their magic from photographers and dealers of well-known respectability and standing, which will be a guarantee that the subjects are entirely free from coarseness, indecency, and vulgarity. Photography has been extensively used for reproducing much that is objectionable and gross, and it is rather a curious fact, which the writer of this leaves to the opinion of his readers, that an immensely circulated cheap weekly paper—a paper that professes to care largely for the moral and physical well-being of the working classes—contains the greatest amount of a questionable character photographic advertisements of any paper out.

A LOCAL EXHIBITION.—A correspondent offers the following hint. In the course of two or three months an exhibition of pictures, photographs, &c., &c., will take place at Tavistock, under the auspices of a Provincial Society, established for the encouragement of Literature and Art. An address and the award of prizes will be made by Earl Russell. The meeting is looked forward to with much interest, and is calculated to be a most influential and successful one; so photographers who have works that they wish to exhibit or dispose of had better prepare and put themselves in communication with the Tavistock Secretary. Photographers should also bear in mind that the time is approaching when the Royal Cornwall Polytechnic—a society from which photography has received so much courtesy and attention—will open the Hall, at Falmouth, for the reception of their productions.

The Sun a Double Convex Lens.—Of all the wild theories which have been invented respecting the nature of the sun, perhaps the most extravagant is contained in "A Treatise on the Sublime Science of Heliography, satisfactorily demonstrating our great Orb of Light, the Sun, to be absolutely no other than a Body of Ice! By Charles Palmer, Gent., London, 1798." The sun is a cold body, says the author, because the temperature decreases as we approach it. Further, a convex lens of glass has the property of collecting all the rays which fall upon it at the focus; a lens of ice has the same effect. For these reasons, he believes that the sun is a huge convex mass of ice, which receives the rays of light and heat proceeding from the Almighty himself, and brings them to a focus upon the earth.—*Every Saturday.*

Surplus Cards.—A correspondent says:—"Since the last notice of the surplus card movement, the professor still unblushingly advertises from his "Notting Hill Villa," and has been followed up by a fresh "enterprise," in connection with which it is announced that, for six stamps remitted, a valuable photograph will be returned; and a chance—a very doubtful one, we should say—of receiving £500, £300, £200, £100, or £50, in a monetary distribution!

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To Correspondents.

J. R. W.—A house with the principal light from the south is very difficult to manage. Your best plan will be to have well-fitting blinds of tracing cloth for your south window, which, when the sun shines, will intercept, or rather diffuse, the direct rays, and destroy as little light as possible. These blinds may, of course, be removed in dull weather. A white reflecting screen at the north side will be useful.

A Perplexed One.—Your formula appears correct in all respects save one—you add double the quantity of citric acid which is necessary. One grain per ounce of citric acid is the outside proportion which we have found desirable, and you should, therefore, only add half a drachm of the 16-grain solution. If you follow the formula carefully, and the materials are pure, you ought to be able to print in about two-thirds of the time required for albumenized paper. With a good negative, we find from five to ten minutes in sunlight the right exposure. Write again, and let us know the result of further experiences. The appearance of the preparation should be opalescent or milky.

H. C.—The chief fault of the prints enclosed is a little over-intensification. The group of five is under-exposed. The single portrait of a little girl is the best of those sent. Green is not a good colour for a blind. Carefully avoid under-exposure and over-intensifying.

Stereo.—The process you quote will produce very good results, but is rather troublesome. The process with collodio-chloride of silver will give you very similar results with much less trouble. If you want more vigour, then you must employ a developing process, printing either by superposition on dry plates, and developing, or employing camera printing with wet plates.

A. K. Sparke.—We shall have much pleasure in seeing some examples of the work of the lens you mention, and to hear further particulars.

E.—A solution of shellac in methylated alcohol answers very well, and does not subject you to much of the risk you mention. Of course, if you use black varnish for the edges of the plate, and then use a clean varnish in which the same solvent is used as that employed in the black varnish, you run a risk of staining your plates. If you had used a spirit varnish after applying the black varnish you mention, it is probable that the latter would not have been dissolved; but using a benzole varnish, which is a ready solvent of asphaltum, you get the result you describe. 2. Tannin solutions do not keep well. The addition of alcohol will improve the keeping qualities.

J. H. W.—The use of a final wash of gallic acid in Mr. Gordon's hands, with the plates described, gave greater intensity and much less sensitiveness. 2. It is not necessary to change the distilled water for every plate; but after (say) six have been washed, take fresh water for the second bath, and take the second for the first. It is possible that much less frequent changing may be found practically to answer. The object of using distilled water to wash off the silver is to avoid forming on the film traces of chloride of silver or carbonate of silver from the soluble chlorides or carbonates generally present in common water. 3. Mr. Gordon mixes an ounce of the preservative, which serves for a couple of plates, and then mixes more as it is required. It would not be wise to mix it for a batch. 4. We cannot state the relative rapidity of the lens employed with those of other makers; but you may form an approximation by comparing focus and aperture, as stated, with those in other lenses. In the stereo lens mentioned, the stereo plate is well covered with the aperture stated. It is especially made to give good definition with a large aperture. 5. In Mr. Gordon's practice, beating the albumen answered best; but we have heard several confirmations of the excellence of the method of simply stirring, as given by Mr. Ackland. We shall publish any further important conclusions which may be arrived at, as Mr. Gordon is still pursuing experiments.

B. R. (Leadgate).—We have not had sufficient experience with either of the lenses mentioned to state which is best. We should prefer, however, the second mentioned.

Durrant.—A fixing bath of four ounces of hyposulphite of soda to a pint of water will answer for developed as well as for direct prints. As a rule, they should remain in for from fifteen to thirty minutes. 2. In printing by development, we should use as much care to exclude white light as in taking negatives.

Discrepancy.—If you read the two statements carefully, you will find there is no discrepancy. The experiment described in our article of May 4th was with a stereo lens of six inches focus and aperture of a little more than half an inch; that described last week was with a lens of seven inches focus and an aperture of little more than one-third of an inch. Relatively, the proportion of aperture to focus was about half, in the latter experiment, of that in the former experiment, which would give for the latter four times as long exposure as the former. A little more than four times the exposure was given, and the plate was considerably over-exposed. In each case the calculation was to give four times as long as the time required for a wet plate, and in each instance it was found that three times as long as a wet plate would have been sufficient.

James Schofield.—Your plan, generally, is very good. We should prefer the roof a foot or two wider, if possible; and it would be better to have the height at the ridge, in that case, fourteen feet, so as to secure a good pitch, and avoid risk of water getting in in wet weather.

An Humble Beginner.—To make a negative bath, dissolve thirty grains of nitrate of silver in an ounce of distilled water, and add two grains of iodide of potassium to a pint of the silver solution. If the materials are pure, such a bath will work at once. Sometimes it will be necessary to add a drop of nitric acid. Sometimes, if any organic matter be present in either silver or water, it will be desirable to neutralize and sun the solution; but, as a rule, the bath will work well at once. As a beginner, you cannot do better than use, as a developer, fifteen grains of protosulphate of iron dissolved in an ounce of water, and with fifteen minims of acetic acid added.

Peep O'Day.—We shall call, if possible. The cards display some very excellent photography indeed. There is, in some of them, a little room for avoidance of unnecessarily parallel lines.

A Student.—We are not surprised that you are not able to understand or profit by the declamatory articles on art to which you refer. It would be surprising if you did. A writer who cannot produce a good picture cannot be expected to teach others to do so. The examples of your work, which you enclose, are, in many respects, good. The photography is excellent, but there is room for improvement in art qualities. In this respect No. 1 is pretty good; No. 2 less so; No. 3 a little awkward; No. 4 is pretty good; No. 5 should be vignetted, as the figure could not possibly sit on nothing; No. 6 a little stiff; No. 7 good photography and a good position, but pedestal, curtain, and background all wrong. We have not space for minute criticism on each picture. If you obtain the lessons by post, which you propose, you would find it a good plan to send up pictures to your teacher. The minute criticism of the special faults of your own pictures will give you more help than any amount of general instruction. Mr. Robinson still undertakes the tuition to which you refer, and we know none more capable than he. A study of his pictures will help you much.

Engineer.—You will get the fullest information on the subject from Marion and Co., Soho Square. We shall have pleasure in seeing examples.

Caution.—We cannot speak with absolute certainty; but think there is not the slightest probability of the old engraving and the old lithograph, of which you enclose prints, being copyright.

J. B. Forster.—Thanks for the print. It seems to afford the most practical illustration possible of Mr. Rejlander's condemnation of the tunnel and top front-light

Thos. Hawthorn.—To clean and restore old Daguerreotypes, first wet the surface all over with distilled water, or, if any trace of grease be present, which would repel the water, first wash with alcohol. When the water flows evenly over the surface, apply a fresh 30-grain solution of cyanide of potassium; this will rapidly remove the tarnish, &c. Then quickly wash thoroughly, rinse with distilled water, and dry by applying the flame of a spirit lamp to the back of the plate, drying from the top corner to the bottom corner. Without some experience in Daguerreotype manipulations, it is easy to fail in this operation.

Several articles in type are again compelled to stand over until our next.

Several Correspondents in our next.

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Photographs Registered.

Mr. J. Hedderley, Chelsea,
Photograph of Cheyne Row, Chelsea.
Mr. H. Pointer, Brighton,
Two Photographs from Painting in Oil, "Wayside Cross."
Photograph—"Scene in the Painting Room."
Photograph from Engraving, Vandyke's "Assumption"
Mr. George Bell, Carlisle,
Photograph of Thomas Carlyle's Birthplace.
Messrs. S. and D. Smith, Rothesay,
Two Portraits of J. Lamont, Esq., M.P.
Mr. F. Downer,
Two Photographs of Langley Bury Church.
Two Photographs of Watford Church (St. Andrews).
Mr. Mayland, Cambridge,
Two Portraits of Prince of Wales.
Two Portraits of Prince Teck.
Mr. Charles Webb, Bromsgrove,
Photograph of Bromsgrove Church.
Mr. Hunt, 30, Piccadilly,
Portrait of Sir F. Grant.
Mr. E. L. Hill, Bath,
Photograph from Picture of "Leonore,' by J. J. Barker
Messrs. Wheeler and Day, Oxford,
One Photograph of Oxford University Athletes.
Messrs. W. and D. Downer, Newcastle-on-Tyne,
Portrait of Rev. G. Gilfillan.
Mr. W. Chard, Hawick,
Two Portraits of Mr. W. Moffatt.
Mr. D. Hains, Kensington,
Portrait of Brinley Richards.
Messrs. Mencalfe and Evans, Cork,
Portrait of Hon. E. A. Demolyen
Messrs. J. Russell and Sons, Chichester.
Six Portraits of Prince Teck.
Mr. John Pattison Gibson, Hexham,
Photograph of the Marchioness of Queensbury

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 403.—*May* 25, 1866.

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FURTHER REMARKS ON TUNNELS, FRONT LIGHT, ETC.

Since the appearance of our article on this subject, some weeks ago, we have received many letters referring to it, several confirming the statement of "One who has paid for his Experience," and some adopting other views, but all more or less confirming the principle we laid down. We have a few further observations to make in fuller explanation and elucidation of the question, and one or two further extracts to make.

In the first place, in regard to tunnels. It is assumed by many that the "tunnel" form of glass-house was based on a new principle not before recognized in photography. Those who have built the glass-house of the same or a similar design as that with which the tunnel was recommended, and have failed to get either good lighting or sufficient light, condemn not only the glass-house of that form, but the tunnel and all associated with it. Now we have to show that the principle upon which the tunnel was based was an old one, thoroughly recognized in photography, and that there was nothing new about it but the design for its application, which design, it seems, has, in most cases, turned out most disastrously impracticable and useless. The principal aim of the tunnel was to avoid as much illuminated atmosphere between the lens and sitter, to preserve the lens from diffused light, and to enable the sitter to look into darkness, and thus rest the eyes, instead of dazzling them by an excess of light not required for illuminating the sitter generally. All this is most desirable, and its importance has been recognized from the earliest days of photography. To effect the object in some degree, it has been common with many operators to adopt the plan, first introduced by Mr. Claudet, we believe, of placing the camera in a movable dark chamber of five or six feet wide and deep, which effectually shielded the lens, made focussing easy, and gave the sitter a dark object to which the eyes might be directed. Nearly six years ago we received from Mr. J. C. Leake, jun., well known to London photographers as an able and intelligent operator, a brief sketch of his idea of the best form of glass-room. It was not then printed, because he intended at the time to work the matter out in more detail for publication. The "Hints," as they are called, are terse, and thoroughly to the purpose, and it will be seen that the proportions and arrangement, for securing the ends we have mentioned, indicated in the design, are just the same in principle here as in the tunnel form:—

"Hints on Lighting.

"1. Remember, you have to light, not the room, but the sitter; therefore, concentrate the light as much as you can *on* the sitter, and avoid diffused light in the room.

"2. Get as much *direct* light on the sitter as possible (of course, without getting cast shadows), and use plenty of 'top-light.'

"3. Avoid having any bright or light-coloured object before the sitter; especially avoid sunlight between the camera and the sitter.

"4. Light the sitter from the top and sides, and *not* from the front.

"5. Keep the lens well shaded from the light, and avoid a window, or anything bright, in that part of the room to which the eyes of the sitter are directed.

"6. Have the room painted drab in preference to the usual blue and white, which diffuses a deal of light, and wearies the eye.

"In this way we should get a nice dark end to work in; we should not require more than half the curtains; and, I think, the room would be much cooler than ordinary glass-rooms.

"I think the following would be a good plan for lighting a room for portraits:—

4 feet opaque.	8 feet glass.	Indefinite length opaque.

It will be seen that there are at the background end four feet opaque, then eight feet of side light, the glazed portion extending over the roof and on both sides; the indefinite length, with opaque walls, answering to the more recent tunnel. When the tunnel was proposed, we saw that it was a simple method of applying a principle we had always advocated, and for that reason we gave it a publicity and prominence which brought it under the attention of photographers generally. We warned photographers at the time of the possible lack of light involved in the form recommended. Notwithstanding this, many were built, and, we regret to say, in the majority of cases with very unsatisfactory results, chiefly because the light has been insufficient to admit, with advantage, of due arrangement and control. The principle, of which the tunnel itself was but a new application, was good: it is the new application merely which turns out unsatisfactory. The chief disadvantage of the tunnel itself is its gloomy and unsightly effect; but, so far as the question of lighting goes, it might be added to a ridge-roof glass-room without any other disadvantage than its unsightliness, and the difficulty of arranging and furnishing such a room so as to secure either comfort or elegance. In the new studio of M. Silvy, which we hope shortly to describe in detail, he has fully availed himself of the principle of the unilluminated ends, with abundance of high side light, without employing any unsightly tunnel, and has so arranged his studio as to secure a most handsome and cheerful room. Whilst it is clear, then, that general experience condemns the tunnel, let none forget that the principle of which the tunnel was a new application is good, and should be maintained, even if the new and unsatisfactory application of it be discarded.

The question of front-light, which has been much associated with the tunnel, is really a distinct one. The sloping front light has been generally adopted with the tunnel form, and this light—except in rooms sufficiently large, and having sufficient amount of glass to admit of excluding and controlling the direction of light without loss of illumination—is found most difficult to manage. If no blinds are used, the pictures are both flat and hard; if blinds are used sufficiently to get modelling, the exposure is too much prolonged for practical purposes. The form originally suggested, of a flat top and direct front light in conjunction with a small side light, has not, so far as we know, ever been tried, nor is it very likely to be. In a large room with sloping front light it is easy, as we have shown, to get the effect of a high side light, and in such case nothing can be better than the effect produced.

We shall here quote from two or three of the many letters we have recently received on this subject. An esteemed correspondent, who sends us a charming card as an illustration of his remarks, says:—

"My Dear Sir,—I always read, with especial interest, the articles, in your valuable paper, upon lighting; because success in photography depends ultimately, in a great degree, upon the due management and control of light.

"Your able article, last week, on front light and tunnels, contained a letter from 'One who has paid for his Experience,' in which the writer would fix upon you the responsibility of his having failed to get good negatives from a sloping skylight in his studio.

"But, surely, as Editor of the Photographic News, it is your province to chronicle, and bring to a focus, every new idea; leaving to others to work out in practice and test the value of every new suggestion in the rapidly progressive art of photography.

"Thus the brilliant suggestion of to-day becomes to-morrow a stepping-stone to further progress and improvement.

"Like 'One who has bought his Experience,' I, too, built a studio, founded on suggestions in the Photographic News, and nearly of the same proportions as his. Like him, too, I found myself involved in great difficulties, and soon discovered that the sloping roof was a failure, because, with its peculiar shape, you have far less control of light than with the ridge roof, and there is great difficulty in the management of the necessary blinds.

"But I entirely endorse your opinion that proper lighting may, under certain conditions of size, be obtained in almost any form of glass-room.

"I have succeeded in making mine work to my satisfaction, and, under favourable conditions of light, can get good negatives in four seconds.

"It is evident that the failure of 'One who has bought his Experience' arose from the insufficiency of light in his studio, with one side opaque when the sky-light was three parts covered with blinds; and possibly the quality of the glass used may have had something to do with the failure he describes.

"I enclose you a specimen taken under my sloping skylight, and remain, yours very truly, James W. Sclater."

"*Newick Park, Uckfield, May*, 2, 1866."

Another correspondent, who sends some excellent cards, says:—

"Sir,—I notice, in your Friday's impression, that 'One who has paid for Experience' is inclined to lay on your head the blame of his failures in the tunnel studio. I beg leave to say that for the last eighteen months I have been using a glass-house, or studio, the proportions of which are almost identically the same as that which your correspondent finds so faulty, the principal difference being, that mine is erected from north to south it is lighted on both sides, and the glass reaches to the ground. I do not say that I have had no difficulties in my operations in it, but the use of different sets of curtains has enabled me to manage the lighting of my sitters, and to win the very favourable notice you gave the specimen I sent you a fortnight ago.

"I enclose a few more cards to show the result of labours in 'the tunnel.' I would like your opinion of them. I don't think they are deficient in roundness.—I am, sir, your obedient servant, "George Bruce.

"*Dunse, 30th April*, 1866."

In these cases it will be seen that the difficulties have been met and conquered. Three or four other letters, now before us, from correspondents who are still beset with these difficulties, and who, from the limited size of their rooms, do not find it easy to spare any light, yet who, using all the sloping front light they possess, get hard flat pictures. It is therefore that we strongly counsel our readers to adopt the ridge-roof form, as presenting the fewest difficulties, being easy to manage, and giving, as a rule, the best results. We give this advice as the result of much observation and the carefully collated experiences of ourselves and many first-rate portraitists of extensive practice.

It may be interesting, notwithstanding, to state that some able photographers prefer to obtain their chief light from a sloping front skylight, when they can command such dimensions as will give them complete control over the direction of the light. Here is an extract from a recent description, in the *Philadelphia Photographer*, of a new studio, recently erected by Mr. Wenderoth, a photographer in large practice, Philadelphia:—

The room is built on the roof of their ground-floor exhibition-gallery, opens to the north, east, and west, and is 46 feet long by 25 feet wide, with a northern exposure at the top, and an eastern and western at the sides. The highest part of the top light is 20 feet from the floor, and the lowest, 7½ feet. That part where the sitters are posed is divided in the centre by a movable screen, extending from the back wall into the room 18 feet, and reaching close to the blinds of the top light, thus separating the room into two independent parts. Particular care has been taken to make the floor as firm as possible, so that the walking and moving of objects on one side may not interrupt the work on the other. In taking large groups, the central screen is removed to one of the side lights, thus shutting off the light from the one side; while the other side light is closed by its blinds or curtains, and the picture taken by the top light only, thus producing a uniformly well-lighted picture. As the lowest point of the top light is 7½ feet from the floor, and 16 feet distant from the sitter, the shadows under the brows, nose, and chin, are not heavy. The highest point of the side light, which is towards the back wall, and 6 feet from it, is 20 feet, commencing 2 feet from the floor, and is arranged with blinds and shades. The skylight, which is 18 feet deep by 25 feet wide, extends all across the room, and is provided with four rows of blinds; the two central rows are 5 feet, and the rows near the side lights are 8 feet wide each; each row is divided into two sections, the upper of five, and the lower of nine blinds each, making in all eight sections, so arranged that each one is independent of the others. These blinds are 18 inches wide each, in the form of rectangular frames made of well-seasoned wood, covered with light blue muslin, and at such a distance from each other, that when opened to admit a full light, the perpendicular rays of a July sun are excluded. When shut, they cover each other three inches, and turn in the opposite direction from the sitter. They are hung by having wooden pegs in the centre of the smaller sides, fitting in corresponding holes in a narrow beam between each two rows, and each blind has an iron staple in the centre of the lower side. The one of the uppermost of each section is the longest, diminishing in length towards the lower ones, where it is scarcely more than a screw-eye. These staples are attached each to a screw-eye which is fastened to a wooden strip on which upper and lower end ropes are fastened, which, going over pulleys with weights on their ends, are the means by which they are moved. Particular attention must be paid to the distances in which the screw-eyes are fastened to the wooden strip, which is regulated by the length of the staples, so that where the staples are longest the screw-eyes are farthest apart.

The glass of the sky and side lights is an unground, transparent, good quality of window glass.

The northern end of the room contains the dark-room and customers' waiting-room, connecting this part of the establishment, through a wide, easy stairway, with the exhibition-gallery below.

We close this article by an extract from a letter received some time ago from a very able photographer, advocating front light, the only one of any practical skill or judgment whom we have known to advocate front light. He says:—

"I grant, at the outset, that *theoretically* your view of the matter is just. Side-light is the only light necessary, or, indeed, desirable; but this I say—and find in practice—will only do to photograph theoretic sitters. 'Take a plaster cast and observe the effect.' But our customers are not of plaster, but flesh and blood, with what is worse—skin, freckles, wrinkles, and other superficial signs that flesh is heir to. Now take one only of these, the skin—which, on most faces belonging to sitters above fifteen, has a decided texture—and suppose it to be lighted by a side light only. The hills and valleys are differently illuminated, the heights brilliantly so, while the sunken parts are in comparative shade. This fact, reproduced by photography, is anything but becoming, the texture appearing magnified and exaggerated, which, in fact, is the case. How much more disagreeable are the results of *only* side-lighting on wrinkles, small-pox holes, high cheek bones, and such like! To obtain a becoming picture, therefore, a side-light must be tempered with light from other quarters, and the point upon which we appear to differ is, as to the quantity of that additional light, and the direction in which it should fall on the sitter. My opinion is, that in the large number of cases where an ordinary side light effect is aimed at, the auxiliary light should be a *front* light. This opinion I will maintain against all comers—album in hand. By using a light striking the sitter in a line from the camera, all that portion of the subject appearing in the picture will be softened, and harsh contrast corrected; wrinkles and creases will appear as in nature, and not exaggerated by unnatural shadows; and the drawing of parts hidden entirely from the main or side light will be sufficiently given. Great attention, however, must be paid to the quantity of this front light, and the angle at which it falls on the subject. It should be as low as possible, to correct the *excess* of shadow thrown by the side light, which will mostly be made to come partly from above; and, above all, it must be reduced by blinds or screens to a less intensity than the side light, else the drawing and roundness would suffer; and on the side of the sitter furthest from the side light there must be a screen of black, green, or some light-absorbing colour, to prevent any of the diffused light from any source being reflected in that direction. To resume. The side-light gives the roundness and general drawing; the front light corrects the too harsh contrasts. These are my reasonings, which I beg you will battle down, if you can; but I tell you beforehand, they have a tolerably deep root, and you have somewhat compromised yourself by the praise you have kindly bestowed upon pictures lighted on the principle I advocate."

Admitting all the force of our friend's argument, and we print it as the only real argument for front light, it appears to us to prove convincingly the correctness of the position we have always assumed. Side light is to give the relieved contours, whilst front light is to be used as a corrective or softener in the case of rugose skins, because it tends to soften or flatten little inequalities of texture in the skin. This very fact proves that if front light were the chief light, it would soften and flatten the whole face, and decrease the relief or inequality of the features which constitute the form and character of the face. We do not object to front light to illuminate the little crevasses and valleys in faces of alpine texture; we rather insist on a power of regulating the side light, and giving it a more or less advanced position to suit varied sitters; but for relief and modelling we maintain that the principal light should be high side light.

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SEARCH AFTER THE BEST DRY PROCESS.

The enquiry for the best dry process becomes more frequent as the season advances. The answer must be furnished by each operator for himself: we can furnish data, and disseminate evidence, but it is not our province to attempt a decision. We have received from Mr. D. Hornby, of Driffield, a communication suggesting a further extension of the kind of competition suggested by the dry-plate tournament we recently described. His suggestion is, that all interested in dry-plate photography, and who have any experience in it, should state the conclusion derived from such experience, give details of the processes they have worked, and the results they have obtained. These communications Mr. Hornby undertakes to analyse, and forward a report or synopsis to the various journals.

Mr. Hornby proposes to prepare a set of queries of a minute and searching character, copies of which he will supply to all applicants to assist them in giving information on the most salient points. These examination papers he will also forward to such members of photographic societies and others as may be most likely to assist by their information. The idea is undoubtedly a good one, and if it can be carried out will assist materially in aiding to settle this vexed question. We commend, therefore, the project of Mr. Hornby to the attention of our readers, and trust they will cordially co-operate with him in bringing it to a satisfactory issue.

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THE MAGIC PHOTOGRAPH PATENT.—ACTION OF LIGHT ON PLATINUM.

The re-discovery of facts and processes in science is a circumstance which might readily be anticipated, and it is not discreditable to an experimentalist that he is not familiar with every fact in connection with the subject of research. When, however, these re-discoveries are patented with avidity, apparently without consideration as to the right to secure a monopoly, the patentee commits an act of folly, for the loss consequent on which he will receive little sympathy. The patent recently entered for the production of "Magic Photographs" by bleaching with bichloride of mercury, and then blackening with hyposulphite, is one of these acts of folly. The method was discovered sixteen years ago, and fully described by Sir John Herschel in the *Philosophical Transactions*, and his paper has been repeatedly quoted since its original publication.

In referring to that paper, we may incidentally mention another circumstance, a discussion relating to which has recently appeared in our pages. We allude to the action of hyposulphite of soda on prints produced by exposure in full sunshine and in dull light. In the paper published in 1840, Sir John Herschel mentions the much greater reduction of the half-tones, in the course of fixing, which takes place in prints produced in dull light than in those subjected to strong sunlight. He says: "There is a remark which ought not to be omitted in regard to this part of our subject, viz., that it makes a great difference in respect of the injury done to a photographic picture by the fixing process, whether that picture have been impressed by long-continued action of a feeble light, or by the quick and vivid one of a bright sun. Even supposing the pictures originally of equal intensity, the half tints are much less powerfully corroded, or washed out, in fixing in the latter case than in the former."

It is further worthy of remark, in reference to magic photographs, that the prettiest form in which these illustrations of drawing-room science have been issued is the "magic photograph in colour" of Mr. Werge, which is also produced by an application of the cyanotype process of Sir John Herschel. On the question of the patent to which we have referred, and also on the subject of a curious action of light on platinum, Sir John has favoured us with a communication, which is as follows:—

"Sir,—As you have given insertion to my letter to Mr. Brothers, on the subject of my early announcement of the availability of the hyposulphites as fixing agents, perhaps you would not object to the further insertion of a short notice in the form of an extract from my paper in the *Philosophical Transactions*, February 20, 1840, which, if I mistake not, effectually invalidates the patent which I understand to have been taken out for the production of the "Magic Photographs" which have of late excited so much attention. It runs thus:—"By far the most remarkable fixing process with which I am acquainted consists in washing over the picture with a weak solution of corrosive sublimate, and then laying it for a few minutes in water. This at once and completely *obliterates* the picture, reducing it to the state of perfectly white paper; on which the nicest examination (if the process be perfectly executed), can detect no trace, and in which it may be used for any other purpose, as drawing, writing, &c., being completely insensible to light. Nevertheless, the picture, though invisible, is only dormant, and may be instantly revived in all its force by merely brushing it over with a solution of a neutral hyposulphite, after which it remains, however, as insensible as before to the action of light. And thus it may be successively obliterated and revived as often as we please. It hardly requires mention that the property in question furnishes a means of painting in mezzotinto (*i e.*, of commencing on black paper and working in the lights) as also a mode of secret writing, and a variety of similar appliances."—*Philosophical Transactions*, 1840, p. 6.

"I cannot recover the exact date of my first application of this mode of fixing, but it must have been prior to October 15, 1839, on which day I exhibited it to some friends at an evening party.

"As magic pictures are in vogue, I may be pardoned for calling attention to a mode of producing them which I communicated to the British Association, at their meeting of 1843 (Proceedings, August 22), resulting in the production of dormant pictures developed by simply breathing on them, previous to which, of course, they require to be kept perfectly dry. The process will be found described in the report of the meeting in the *Athenæum*, No. 829, p. 847. Conceive the astonishment excited by seeing, for instance, one of Mrs. Cameron's wonderful productions starting into existence by simply breathing on a sheet of white paper!

"That I may not obtrude myself on your notice empty-handed, I will take this opportunity to mention the production by prolonged action of the solar rays on solutions of platinum alkalized by lime or baryta-water, of a *black* precipitate, *subsequent to the complete production and subsidence* of the white photo-platinate (as described in your No. 383). This singular effect has occurred to me on three or four several occasions; but, up to the present time, I have been unable to ascertain the cause of it, or discover a mode of producing it *ad libitum.* It may *possibly* arise from the accidental presence of some minute portion of some of the other "platinoid" metals, but this I very much doubt. The effect comes on very slowly, and only in strong sunshine. After the complete formation and subsidence of the white or yellowish precipitate, the liquid darkens, and *at length becomes as black as ink*, by the formation of a most minutely divided black or very dark grey powder, which is the matter in question.—Your obedient servant,

"*Collingwood, May* 19, 1866. "J. F. W. Herschel."

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KEEPING THE SPECIMENS OF OPERATORS.

There is a practice which has been gradually growing into a crying evil, in reference to which we have before published complaints, but which appears to be so growing in magnitude that it will require very stern treatment before it is entirely ended. We refer to the practice of employers retaining the specimens forwarded to them by operators desiring engagements. This is alleged to be done from various motives: in some we are informed that the specimens so sent are retained because they are worth exhibiting. We hope that there are not many employers so dishonestly mean as this implies. It is probable that, in the majority of cases, the retention is simply the result of forgetfulness, inattention, procrastination, or similar neglect; but, whatever the cause, the result is the same. An operator making application for an engagement naturally sends his best specimens, in the hope of securing the position he is seeking. It may be that a dozen so apply for one engagement, and eleven are necessarily disappointed. If the specimens of these eleven men are detained, it scarcely requires a moment's reflection to show the painful embarrassment and probable loss they sustain in consequence. The hardship is peculiarly severe when it is remembered that, as a rule, employers disapprove of operators producing for themselves, or appropriating out of stock, examples of the work they are doing. In some cases charges of theft have been preferred against operators thus helping themselves to specimens. We place it before all who are concerned in the subject on which we write, not simply as a matter of courtesy or consideration, but as an act of common honesty, which they cannot disregard without shameful guilt, to return promptly, in all cases, the specimens of unsuccessful applicants. And let employers bear in mind that, in thus keeping back specimens, they are absolutely the tempters to dishonesty in operators, who, by their conduct, are induced to provide themselves often with large stocks of specimens out of the property of their employers, not so much to recoup themselves, as to provide against the emergencies which the prevalence of this bad practice brings about. We have spoken strongly on this subject, because the circumstances needed it, and none but the culpable can wince at our remarks. We trust that they will have the effect desired, as we should deeply regret the necessity of stronger remarks, or stronger measures, which the robbery of the unemployed operator might seem to call forth and justify. We append a letter just received on this subject:—

Sir,—I wish, with your leave, to utter a word of complaint, or expostulation, with which I am sure many who read these lines will, from their own experience, sympathise. Though I have myself several times suffered, I do not write for myself only, but for many of my fellows who have suffered still more, as I have heard from their own lips. I speak of the careless—I might almost say, the unfeeling—way in which the "Specimens" of operators out of work are kept by not a few of those who advertise for assistants and demand the specimens of those who apply.

Some have to be written to over and over again before they will return them, causing loss of both time and money; and there are others who seem never to intend to return them at all; at least, they never do. I heard, not long ago, the case of a poor fellow who was almost starving, while an advertiser thus persisted in keeping his best specimens. Though he was plainly told the injury he was doing the man, he took not the least notice, and, for aught I know, he is keeping them still.

And I have known other cases nearly as bad. I know also that the same thing is complained of at the London Agency. A friend of mine told me he knew one man who kept quite a collection of specimens so obtained, and took a pride in exhibiting them to his friends, much as the "Mohawks" and other "gentlemen" who infested London streets before the light of gas and bulls'-eyes was turned on them, used to exhibit their collections of door-knockers and bell-handles, only the latter certainly required a little more prowess and pluck than this "collecting" poor photographers' specimens. But seriously, dear Mr. Editor, is it not dealing rather too hardly with us?

Some of the upper crust may indeed be independent of such help, but while employers almost always call for specimens, we must send them; and to keep them is very much like stealing our characters.

You know well that operators out of work are not generally gentlemen of unlimited means, and many a poor fellow, I assure you, is "hard up" when out for weeks. It is true that these cases of detention are the exceptions. Many are sent back at once; others may be unavoidably kept some time for comparison; but, making all allowance for this, the "exceptions" are sadly too numerous, as many of your readers will be ready to echo. May I, then, appeal to the good feeling, the brotherly feeling, of those who, perhaps, have hitherto thought nothing about this matter.

Of the special cases referred to above I have no hope; but surely most masters are willing to regard their assistant as both a "man" and a "brother."

I could easily give names, and I really think it would not be going too far, but I will not. Only, if we were to hold an "indignation meeting" at the office of the News, or the *Journal*, or at the Agency, I know we could soon make out a good "black list."—I am, dear sir, yours truly, Marcus.

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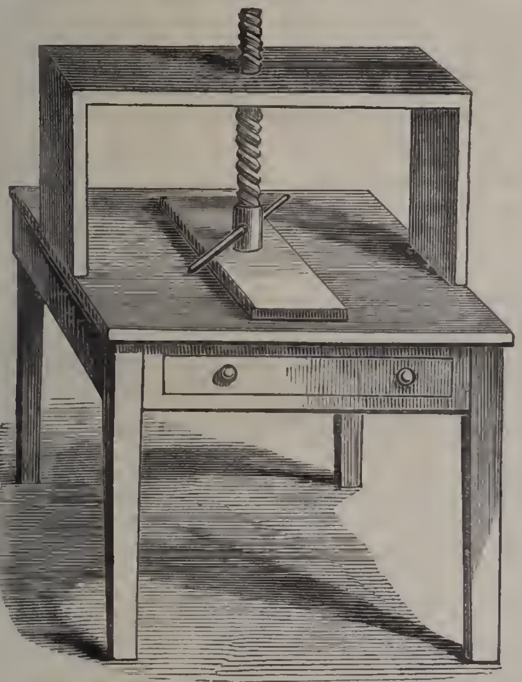
PRACTICAL HINTS FOR THE STUDIO.

BY A PRACTICAL MAN.

Pressing and Glazing Table.—A press and glazing table, from three to four feet square, would be found by photographers of great use, to those especially who have much to do with enlargements. A press, large or small, in some shape or other, is as necessary in photography as a goose is in tailoring. The table, whatever its proportions, must be very massive and heavy, the legs ponderous and strong, the bed or top of at least two-inch pine, and a loose piece of a similar thickness to lay on; then, by turning a screw fitted into a head or cross-piece, a large amount of pressure may be obtained. A drawer in the upper part of the frame will also be handy and useful.



A Damp-Repelling and Preservative for the Backs of Canvas, &c., on which Enlargements are Mounted.—As enlargements are steadily becoming the order of the day, the following composition will be found to have good waterproof qualities:—Take eight ounces of good clean glue size, three ounces of boiled linseed oil, and then *melt* (not boil) and burn the two together in a clean earthen pipkin. To this must be added some lamp-black, purple brown, and red lead; also a little white lead and pipe-clay, all well ground before being added to the size and boiled oil; the whole to be mixed to that consistency technically known as priming. The mill-boards, after having all traces of dirt or grease removed, may receive two or three thin coats of the same, allowing them to dry between each application. In preparing canvas or linen, it should be first strained tight on a frame, and the first application laid on with a palette knife, then hung up to dry in a warm place, after which further applications of the composition may be made with the brush, if a very smooth and even surface is desired. The canvas or linen must be passed between rollers, while any particular tint or colour may be imparted by the use of suitable pigments in the composition.

The Commercial Carte.—I have endeavoured, on various occasions, to call the attention of designers and photographers to the "commercial carte," or business tablet. They might be produced at small cost and in an endless series of designs, thus opening up a new photographic branch, one calculated to go on increasing and permanent, affording employment to a vast number of female hands as extra printers; and if the same idea were adapted and worked by Woodbury's relief and mould process, it would have every chance of becoming a great success, as it would be enabled to compete with costly designs on shell and copper at less than a quarter of their cost; and although an artistic design would have to be made by a competent draughtsman, many very good and effective ones could be executed by persons having no knowledge of drawing at all, but possessing a moderate amount of what is commonly called "gumption."

The Studio Bottle.—The value of this article, which consists of a wide-mouthed bottle with a brush attached to the cork or stopper, will be instantly apparent, and for varnishes, gum, glue that can be applied without heat, and many other compositions in daily use by artists and photographers, of great value and convenience, the brush being always to hand and fit for use; no hunting after it, and, when found, discovered to be worthless.

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"THE REASON WHY" ON PRINTING AND TONING.

BY THE PHOTOGRAPHER'S ASSISTANT.

Alkalinity versus Acidity.

A question which admits of argument necessarily possesses two sides; and as it deals with the definite or indefinite, such questions must be classed with one or the other of these two degrees. The first deals with subjects which depend more on practical and visible proofs for support than on the assistance derived from wordy warfare. The last, dependent on reasoning ingenuity, remains an open problem, whose two sides are stoutly upheld by their respective adherents. Happily for myself, photographic questions, as a rule, belong to the first degree; hence theoretical impossibilities might sometimes be proved erroneous by the conclusive argument of opposing yet practical demonstration which at once draws down the balance in favour of the successful experimentalist.

In the point now at issue, absolute proof seems to favour one who has dared to oppose many contending opponents who endeavour to uphold the doctrine of alkalinity by the force of logic, instead of applying the test of actual experiment, which, I think, would at once convince them that my isolated position is more true to strict science than they at present seem to imagine.

As the query so courteously raised by Mr. Seely offers an opportunity of acceding to the request of Mr. Cherrill, I willingly re-open a subject which I considered I had worn thread-bare, by repeating, in a popular form, my former remarks on alkalinity *versus* acidity. Judging from the contents of Mr. Seely's paper, and the comments offered thereon by the gentlemen in whose hearing the paper was read, I believe the impression exists that the advantages offered by the proposed modification of the toning solutions are derived from the magnesia. I still adhere to the opinion that the substance named plays "no special part" in the matter. Nay, I will go further, by declaring that, with careful preparation, precisely similar effects can be produced by an addition of carbonate of soda; and I reiterate, the "reason why" the use of the last is not so advantageous as a more insoluble substance proves, is because of the possibility of adding an excess of soda in a fluid state. And now arises the query: If alkalinity is really prejudicial, why should it be so?

Kind reader, we will, if you please, go through a series of imaginary experiments. Never mind how silly they may at first sight appear; each will aid us in arriving at a satisfactory reason why. Remember, if we desire great facts we must not despise little things.

In my hand I hold an untoned print. Before me lies a concentrated gold solution. I immerse the print into the solution. "Yes," say you, "and a pretty mess you have made of it. The picture has nearly disappeared, and the little which remains is nearly slaty—hideous! What has caused such disastrous effects?" I will try to explain. The gold solution contains a portion of the metal in combination with chlorine; and there is also present free acid, which usually accompanies chloride of gold. When the print was introduced, a decomposition immediately ensued—in other words, a struggle began, on account of chlorine's liking for silver, which caused the chlorine to quit the gold to form its preferential companionship with the silver. The grey deposit observable on the print is gold precipitated on the surface of the paper—I can scarce find courage to call it picture, for that has been destroyed by the liberated chlorine, and has also compelled me to pronounce experiment number one a failure. So now for trial number two.

Instead of one drachm of solution, which contains one grain of gold, being added to an ounce of water, only, we will dilute it with 10 ounces of water, and then immerse another print.

"Well, there is a decided improvement, certainly; but not quite the thing; mealy and grey; but a clearer picture. I proceed to improve matters by adding carbonate of soda, until the test-paper slowly turns blue, proving mild alkalinity. How does the print behave now? Ah! that's the thing. No excessive bleaching; no mealiness; perfection, almost. What part has the soda played? I should like to ascertain the reason why."

The larger portion of the liberated chlorine, instead of attacking the silver forming the print, as before, has driven off the carbonic acid, and united itself to the soda, forming chloride of sodium, or common salt. But seeing that our new addition to the batch has improved matters, for purposes of instruction I proceed to divide the toning bath into two equal portions. To the one I add an additional 10 ounces of water; to the other a little more soda. Now mark the results when I immerse into each a print. Ten chances to one that the print in the excessive alkaline solution does not tone at all, and the other is in a similar condition; so now for the "reason why."

When a print is immersed into a gold solution, it is requisite that a small portion of chlorine act on the surface of the print, which causes an immediate deposit of gold, and the particles so deposited act upon other particles until the necessary depth of colour is arrived at. It is an erroneous doctrine which teaches that for every particle or atom of gold deposited an atom of silver has been removed, as I hope to show bye-and-bye. At present I point to the reason why our solutions refuse to work.

First, I call attention to the excessively alkaline one. I just now stated that a small amount of liberated chlorine should attack the prints in order that toning action might commence, but in our excessive zeal for improvement, we have supplied soda in so large a quantity, that it has absorbed the whole of the chlorine first liberated, and if you wait a while you will see a deposit of gold on the bottom of the dish.

But now for the reason why in the other case. The small amount of chlorine has diffused itself by reason of the wider scope allowed the particles of gold. Too feeble to set up toning action, it unites, as far as possible, with the soda, and if any excess remains, it evaporates.

Having proceeded thus far with our experiments, courteous reader, refresh yourself by imbibing a glass of brandy. You "don't drink spirits." So much the better for my illustration. Taste this. It is pure Eau de Vie. You make a wry face over it. Perhaps it is too strong. Add water to it. Now your glass is emptied, fill it with pure water, and test, and you will find a smack of spirits remaining, showing that a small quantity of spirits diffuses itself through a large quantity of the weaker fluid; and the more widely it is diffused the less is its presence felt. Gold toning solutions are the same. The larger the quantity of water added, the more inappreciable becomes the presence of acid or chlorine; and seeing that alkaline substances draw off the chlorine needed for other work, it is self-evident that the presence of an acid, although it perhaps performs no other work, still ensures the absence of an alkali. Therefore, if instead of mixing four grains of gold to a pint of water, we mix it with a gallon, while securing toning action we have room for a larger number of prints to tone at one time.

As the quantity of free chlorine should not exceed that necessary to set up toning action, to avoid danger, I apply boiling water to the concentrated gold solution; and here lies a point which experience alone can describe. I have striven hard to find words to convey the requisite instruction, but have failed. One rule I lay down as a guide. If the solution does not work, too much chlorine has been driven off. If, on the other hand, a trace of mealiness exhibits itself, too little has been liberated. And, in order that the prints might have all the gold, it is safe to add some chloride salt to the solution, to supply all free silver with the coveted chlorine, thus permitting the chlorine which leaves the gold to perform the necessary duty of promoting deposition of colouring material. From the foregoing remarks, it will be seen that I advocate acidity as a sure preventative of alkalinity; and from continued observation I am led to believe that some part is played by the acid. What that is I cannot say; one thing is certain, an absolutely neutral solution (by best paper proof) will not work at so high a dilution as an acid one.

In adopting the dilute solution I recommend, it must be borne in mind that large batches—in fact, a day's work (moderately speaking)—can and should be toned at once and placed in the solution at the same time. I have repeatedly toned from forty to fifty sheets at once, with from five to six grains of gold. To perform the like feat requires experience with the method I advocate, for a wide latitude of dilution, under judicious treatment, is admissible.

Having disposed of the question of toning, I briefly turn to Mr. Cherrill's very sensible objection to the remarks I offered in my last paper on sun-printing.

Where photographic operations depend on the action of solar light, it is wise to make preparations which meet the conditions imposed by the prevailing rule. Sun-light is exceptional; diffused light the rule. We must therefore pronounce a negative perfect which answers to the requirements of that rule. Besides, it must be borne in mind that, while diffused light might be found at one and the same time varying in its intensity, we must take direct sun-light as we find it. There are other objections ready at hand to offer, but I forbear, as space is fast closing in.

Mr. Cherrill overrates the liberality of employers, if he considers that the number of frames at work and the hands to work them always enjoy a due proportion to each other. Until within the last week I have been long working without help (save in the operation of filling), 140, and more frames, fitting vignettes, and all the other etceteras. I am sure that Mr. Cherrill will admit that under conditions such as these a "rare roast" would follow sun-printing.

And now, in concluding the present paper, I have only to add that, as Mr. Seeley declares an acid toning bath endangers permanency, I should certainly esteem it a favour if he will explain the reason why.

My remarks, prepared, on the action of peroxide of hydrogen, must stand over until my next.

M. CIVIALE'S PHOTOGRAPHIC STUDIES OF THE ALPS.

Report presented to the Paris Academie des Sciences.

In seeking to produce the representation of a scene or of natural objects, we can place ourselves at two entirely different, if not opposite, points of view, viz., the artistic point of the view and the scientific. The first, in intellectual as well as in physical phenomena, implies, to a certain extent, the intervention of a personality which, in fact, constitutes, in part, the charm or the merit of the work. It will rarely happen that the absolutely exact, or photographic, representation of an extensive country constitutes what we call a landscape, or that the literal representation of a scene in ordinary life, or an historical episode, can be transferred to the stage, or related in a poem, without variation. For this reason photography can never replace art.

The scientific point of view is quite different. What the *savant* especially desires is, the exact knowledge of the relations between the objects he wishes to study. In other words, and to remain faithful to the comparison we started with, *realism*, which it would be deplorable to regard as the final aim of art, is, on the contrary, what the scientific representation of natural objects must tend to.

Positive geology, in particular, is especially based upon the exact geographic co-ordinates of various points on the surface of the globe, and we cannot safely reason except from faithful representation of the accidents on this surface.

The three general processes which serve to represent the relative positions of geographical points—projections upon a horizontal plane; or *maps*, *profiles*, or *views*, which are projections upon a vertical plane; and *reliefs*, which take into account at the same time the three dimensions—have successively submitted to the progress demanded by this more and more pressing want of accuracy.

Thus map-makers have been compelled to substitute for the informal and unmethodical lines which formerly served to express relief of the soil, the only projections really irreproachable—curves of equi listant level.

For maps in relief, it is only in our own time in France that we have obtained representations in which the relation of the bases to the altitudes is respected, and we know how much gratitude geographers and geologists owe to the perseverance and skill of M. Bardin in this interesting class of works.

We may say that the art of drawing profiles or views has been the last to reflect this imperative want of precision. Whatever care a draughtsman may take to faithfully sketch the outlines of a mountain or a country, without exaggerating anything, he will never be sure that he is free from certain illusions of optics or perspective. Again, geologists, in the majority of their sections, unnecessarily falsify the relations between the bases and the heights. We need not go very far back in science to find arguments which seem to have some import only because they apply to profiles or reliefs, in which not only the inclinations were greatly altered, but which, in consequence of the same defect of construction, exhibit only incorrect relations between the occupied and the open spaces of a country, and between spaces occupied by mountainous masses and the spaces left uncovered by valleys, necks, and slopes.

M. Aimé Civiale saw that this *hiatus* could be filled up in an unobjectionable manner only by photography. Convinced that the geographer, the geologist, and the meteorologist must find in this admirable discovery of our century a means beyond all dispute, and independent of every preconceived idea or personal error, of knowing the real form and relief of mountainous masses, he has brought to bear on this idea, as correct as it is fertile, the resources of the sound scientific education he received at the Polytechnic School; and during the past nine years nothing has been neglected by him to arrive at results useful to science.

The Chain of the Alps, at the same time the most elevated, the most extended, and the most complex of all the European chains, naturally presented itself as the finest subject for studies of this kind: but, before engaging in a sort of struggle with so rough an antagonist, M. Civiale took measures to have every chance of success on his side.

Two journeys to the Pyrenees, during the summers of 1857 and 1858, served to him as an apprenticeship. But previously, in these experimental fields, with but small photographic apparatus, M. Civiale took some very remarkable proofs from the three principal stations he had selected—Bagnères de Luchon, Luz, near Saint Saveur, and Saint Jean de Luz—the merits of which the *Académie* fully appreciated, particularly a panorama giving the whole mass of the Maladetta, various views of the Chaos of Gèdro, and of the circle of Gavarni; and lastly, numerous representatives of the cliffs of the environs of Biarritz, so instructive to the geologist.

Upon his return to Paris he decided to undertake the photographic description of the Alps, and desired to introduce into the processes and instruments the improvements his experience had suggested, such as might facilitate conveyance and working of delicate apparatus in places most difficult of access.

To obtain the negatives, he employed the dry-paper process, collodion plates presenting too many difficulties for transportation in such rough places.

But he greatly modified the ordinary waxed-paper process, the most important change being the introduction of paraffine into the waxing (four parts paraffine to one part bees' wax). The proofs were obtained quickly, and very fine in quality.

M. Civiale had an apparatus constructed for his journeys of easy transport, complete stability, and of moderate weight, giving proofs of large dimensions, 15 in. by 10 in. He also had constructed a double objective, which enabled him to reproduce the whole horizon in fourteen proofs instead of eighteen as before. To diminish the weight of the objective, he substituted a solid aluminium mounting weighing 17½ ounces, for the brass one weighing 6 pounds.

But notwithstanding all these simplifications, and although everything was most ingeniously contrived to serve two purposes, the whole of the photographic apparatus, added to the most modest personal luggage, the weight amounted to no less than 550 lbs., which had to be carried on the back of man or mule to the points selected as stations.

These stations were of two entirely different kinds, according as the operator proposed to obtain a general panorama, or views in detail.

For the latter, the points the best situated to take the structure of the rocks were naturally selected, their regular or displaced arrangement, the fractures and bendings, the general form and inclination of glaciers, the features of their lateral or frontal masses of *debris*, the accumulations of rounded rocks, polished and stratified; lastly, all the circumstances which render the Alps so fruitful to the geologist, and so interesting to the tourist.

Stations of this class are usually easier of selection and access than those chosen for taking views of a group of mountains or a panorama. Besides, for the representation of a partial or limited accident, one or two plates suffice. The members of the *Académie* may satisfy themselves by examining the beautiful albums which, year by year, were presented to the *Académie* by M. Civiale, that these proofs in detail are treated with a perfection equal to that we meet with in the proofs taken by professional photographers.

Panoramas, which constitute the most original and most important part of the task, present great difficulties, both from inevitable discordant lighting in the several portions composing them, and from the choice of the station. Not only does the combination of these stations require their union to well represent the whole of the various masses, and a perfect knowledge of the topography; but there are conditions of altitude to be satisfied. Thus the peaks and necks at an elevation above the sea comprising between 7,500 and 10,500 feet generally present, in the Alps, the best stations for panoramic views. When the altitude attains to 11,600 feet, the valleys cease to be clearly defined; when it is below 6,500 feet, then the summits disappear.

It may easily be conceived that an operation which is pursued during a good many hours of the day requires special precautions, so that the regular displacement of the sun does not illuminate the different parts of the picture in too unequal or discordant a manner. M. Civiale recognized, from experience, that in commencing about seven o'clock in the morning he must first point his camera to the north, then proceed successively from north to west, from west to south, &c. By proceeding in this manner the operator generally found himself, at about eleven or twelve o'clock, facing the east, which is then lighted in the least unfavourable manner.

In order that these panoramic views give the *ensemble* of the mountain chains with precision, the relative position of the culminating points, the direction of the valleys that separate them, &c., it is indispensable, in order to accurately join the proofs, to place the optical axis of the instrument in a perfectly horizontal position. The instrument turns upon its axis, so that each sheet covers the succeeding one about two-thirds of an inch, and the complete circuit of the horizon requires, in M. Civiale's apparatus, fourteen operations of this kind.

The position and orientation of the optical axis of the apparatus were verified at every station; the altitudes were measured by the barometer; the angle within which the panorama is comprised noted, and with the aid of a very simple goniometer, invented by the operator, the vertical angles of the various summits of the panorama above the station determined. It will therefore be easy, with the photographic proof and a detailed topograpical map, to learn the co-ordinates of each summit, or of an interesting point, by reference to an horizontal plan passing through the station.

Lastly, M. Civiale has desired to complete all these data by collecting geological specimens at every point employed as a station, whether principal or secondary, and the collection, already extensive, which he has formed in this manner will not be indifferent for the interest of this photograpic description of the Alps.

(*To be continued.*)

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CASKET MINIATURES IN RELIEF.

[SECOND PAPER.]

On Printing, Colouring, and Mounting the Transparencies.

BY HENRY SWAN.

Although, as a rule, it will be found that the portraits produced by the binocular combination are not only more unmistakable as likenesses, but also much more pleasing in expression than either of the two portraits of which it is composed when viewed singly, yet all this may be greatly marred if, in printing the transparencies, they are either fogged, or, which is still worse, heavy and violent in the shadows. For these transparent prints I myself prefer to use the camera process, as it is then of little consequence what is the size of the image in the negative; besides which, the same negative is available, if wished, at any time, for a cube miniature of extra size.

To those, however, who do not find it easy to obtain good results by camera printing, the collodio-chloride may be used, in which case the negative should be taken so that the head should not exceed three-quarters of an inch from crown to chin.

The best material for the transparency is *fine talc* (which to most, perhaps, will be more manageable by the collodio-chloride process). The advantages of talc over glass for this purpose are very considerable. Talc can be cut exactly to the required size, and trimmed to any nicety. It is not liable to fracture from an accidental fall of the portrait, and as the surface is not exposed, its liability to scratch is of no consequence.

In the early experiments (now nearly five years ago) the pictures were either taken direct on the surface of the prisms, or transferred to them; but as talc, in addition to its other advantages, may be said to occupy almost no space, it is much to be preferred; and this excessive thinness enables the colourist to work on both sides, often no mean advantage for a highly-finished miniature.

The colouring is executed by the ordinary methods for transparencies, and may be either in water-colour or varnishes. It is a favourite plan of one of our most skilful colourists to colour one side in oil or varnish, and the other in water, thus retaining in his control the advantages of both media. The water-colour will be found to work more easily if the surface be previously varnished. There should also be a coat of varnish after finishing, or the paint will crack. For this purpose almost any good negative varnish will answer.

In finishing the pair of transparencies they must be carefully viewed together as a combination, and if there should be any part in the least dazzling to the eyes, on account of there being a light in one picture which does not appear in the other, this obtrusive light must be carefully coloured over. This is a part which requires very careful supervision, as it is amazing how much unconscious discomfort may be inflicted sometimes from want of sufficient care in this quarter. The eye always experiences a sense of uneasiness when there is a light in one picture which has no counterpart in its fellow-transparency. In such cases it is often difficult to trace out the disturbing influence; but when it has been detected and carefully touched out, the great gain is immediately felt.

By carrying out the following method, but little difficulty will be experienced in the mounting.

Mounting the Transparencies.—First, place the transparency, which, if used for the stereoscope, would be placed to the right, *at the side* of the crystal cube. If, on being viewed by one eye only, the image appears in the centre of the opening *when one half is distinct and the other half only faintly visible*, the first picture is in its proper place, and may be fixed there.

The side transparency being placed aright, the other may without difficulty, by closing one of the eyes during the operation, be adjusted at the back of the cube, so that the two images are superposed. Great care must be taken that one image is not higher than the other; and also that the secondary reflection (termed "the ghost") should, as far as possible, be made to coincide in its brightest part with the principal image.

The adjustment of the second picture is made chiefly *by noticing the eyes of the portrait*, which should be a very little to the right of the eyes of the first picture.

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ON PICTORIAL AND PHOTOGRAPHIC REPRESENTATIONS OF MELROSE ABBEY.

BY W. D. CLARK.*

On visiting some parts of Scotland during the summer season, a person must be impressed with the influence of the writings of Scott in directing the tide of tourists into certain channels. At the Trossachs it is Roderick Dhu, Fitz James, and the Lady of the Lake one hears about, rather than of the exquisite beauty of the scenery. At Melrose the great ambition of the tourist is to see the Abbey by moonlight, to visit the house in which Scott lived, and the place where his remains rest. The beautiful scenery of the Tweed, which Scott loved so well, and described so accurately, has but little interest for most of the visitors; their great object is *to do*, as they call it, Abbotsford, Dryburgh, and Melrose Abbeys.

The scenery of the Trossachs was almost unknown to the public previous to the publication of the "Lady of the Lake," though an admirable guide-book to the district had been published a few years previously by the Rev. Dr. Graham, of Aberfail. Indeed, the love of mountain scenery can scarcely be said to have existed in the public mind till after the middle of last century. Travellers in the Highlands, previous to that period, describe the scenery now so celebrated and so much visited as barren wildernesses that it was delightful to escape from. The beauty of the Trossachs and Loch Katrine was quite unheard of previous to the publication of Dr. Graham's book, at the beginning of this century.

With Melrose it was different: the Abbey, displaying much ingenuity and beauty in design and execution, appears to have been long an object of interest to a certain class. Scott simply seized upon this feeling, and popularized it. He did not create the passion for seeing Melrose, as he may almost be said to have done in the case of the Trossachs.

In the year 1743 the Rev. Adam Milne, then minister of the parish, published an account of Melrose, which is in great part devoted to a description of the Abbey, which we learn, from a letter written in 1742, by Mr. Francis Drake, of York, to a brother antiquary, he spent much time in studying.

In this curious letter, dated from Norham, the writer says:—"Our neighbours are not wanting in the faculty of amplifying, but the thing does really exceed all their exaggerations of praise. By this you'll sneer, and say I have lived too long here, and become as vain as they; however, I stand to my assertion.

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* Read at a meeting of the Photographic Society of Scotland, May 8th,

"There is printed an upright of this Abbey, which is ill done. I could wish there was not only an exact whole plate, but also a view of the east end, with a distinct draught of the doors, columns, capitals, and some of the finest images, which are so well finished to the life, that Dr. King, of Oxford, who has lately been to see it, wished they were taken down and preserved from the weather."

The earliest engraving of the Abbey I am acquainted with is from one of Captain Slizer's drawings, made in the year 1683. You will observe that in it all the niches are filled with statuary, and this would have made it very valuable and interesting if it had been accurate; but unfortunately it is not so, for I find he has placed statues where they never could have been, and to an elegant window with one mullion he has given no less than three.

In the year 1804 the late Mr. John Smith, of Darnick, an architect, and the father of one of our members, made a series of drawings of the principal details of the Abbey. Mr. Smith was then a very young man, but his drawings are characterized by extreme care and faithfulness, such as would now have entitled him to be considered a member of the latest school of art in this country. They quite carry out the wish expressed by the old antiquary in the letter I have just quoted, that there should be made "a distinct draught of the doors, columns, capitals, and some of the finest images."

The history of these drawings is curious, and serves to illustrate how little originality there is in the world.

Upwards of thirty years ago there was published a folio volume called "Monastic Annals of Teviotdale," written by the Rev. James Morton, a clergyman of the Church of England. It contained engravings of several views of the four Abbeys of Teviotdale, and also of some of the details of the buildings. Of Melrose Abbey there are twelve subjects engraved of details, consisting of niches, columns, corbels, crokets, and bosses. These are all copied from Mr. Smith's drawings without acknowledgment. The drawings had been lent to a gentleman to copy, and I am informed it was from these copies the engravings were made.

In the Abbotsford edition of the Waverley novels some of these details are cut as head-and-tail-pieces, and are there ascribed to the Rev. J. Morton as artist, the gentleman I have just named as the author of the monastic remains.

About five years ago there was published a prettily got up book on Melrose Abbey. The author was Mr. James Wade, who was living in that neighbourhood at the time. It would be difficult to imagine a book with less originality in it than this. The materials for the letterpress are taken either from the books I have already mentioned, by Mr. Milne and Mr. Morton, or from Mr. Billing's "Antiquities of Scotland." As a frontispiece it has a restoration of the Abbey by the author; the remainder of the wood-cuts are either from photographs or from Mr. Smith's drawings, though the preface is written in such a way as to lead the reader to suppose they are from original drawings. The author borrowed them from Mr. Smith, and cut them down so as to suit his purpose, in many instances, I believe, removing the draughtman's name. It was with some difficulty, I understand, that the drawings were recovered: they have been carefully mounted, and are preserved in a volume by Mr. Smith's son.

In Mr. Billing's book there are eight engravings and two woodcuts, and these form, so far as I know, the best illustrations of Melrose Abbey yet published. I had lately an opportunity of examining the original drawings, which are in the possession of a gentleman at Melrose. They are very careful and accurate drawings, picturesquely treated, and have been well engraved, about the size of the originals. There seems to be one objection to them, arising from the small scale on which they are executed. In order to render the decorations, that (to use Mr. Billing's own expression) run over the building like lace, distinctly visible in the drawings, it was necessary to make them on a much larger scale than in nature. This dwarfs the appearance of the building, and makes the drawings look as if they had been made from a model rather than from nature. This is very marked on comparing the engravings with the buildings, or with good photographs from the same points.

Last season Mr. Smith proposed to me that we should make a series of photographs of the Abbey, going over it bit by bit, so as to secure the principal details, and that we should do it in spring, so as not to be interrupted by the tourists. As I had a few years ago thought over this subject, and corresponded about it with an old schoolfellow, now gone, I willingly embraced the proposal. I joined Mr. Smith at Melrose at the latter end of March, as soon as we might expect suitable weather. We have devoted five weeks of hard work to the subject, and we are not yet quite finished.

The first point was to secure the permission of the Duke of Buccleuch, and of those gentlemen who are responsible to him for the conservancy of the building. This was at once granted at Mr. Smith's request. The next thing was to obtain a scaffold that would be sufficiently light to be removed from point to point without much loss of time, and be sufficiently steady for the camera and ourselves. To Mr. Macdonald, a tradesman of Melrose, we are indebted for entering on our plans with great enthusiasm. He constructed scaffolds for us with much ingenuity, by which we reached difficult and even dangerous situations with perfect safety; and he did this with such care and precaution that not the slightest injury was done to any of the delicate ornaments of the building.

As we had a suitable dark room close to the Abbey, with a supply of water in it put at our disposal, we used the wet process. I am indebted to Mr. Smith's good manipulation for the large number of clean and bright negatives we secured. In a case like this, where we intended to take a large series of views of one building, and had every facility for working wet plates, I would prefer the wet process, but when taking a series of views at distant points from each other, I would much rather use collodio-albumen plates. It is a huge advantage in the country to get rid of tents, baths, and solutions of silver, and other substances that produce stains on the hands and clothes. To be able to concentrate the attention on the camera and its slides only, and to have no distracting thoughts about baths and such things, is no mean advantage that dry plates have over wet ones. With regard to the quality of the results, after giving much attention to the subject, I have come to the conclusion that a fine collodio-albumen negative *is, on the whole*, a better thing than a fine negative by the wet process. There is a combination of force and delicacy to be had with collodio-albumen that is very difficult to secure with wet collodion. Then the power that we possess of deepening or reducing collodio-albumen negatives, either whole or in part, and that after they have been varnished and printed from, is a great point. Again, in printing where a large number of impressions is required, the hard surface of the dry plate is a great advantage. The varnish can easily be removed, whenever it is requisite, and be replaced again.

The wet process has the great advantage of allowing figures to be more easily introduced, and we made use of this in many of our negatives, and introduced figures of considerable size.

Our distinguished President, Sir David Brewster, sat to us. Our late Secretary, Mr. T. R. Johnston, is introduced in more than one of our subjects. His eminent brother, Dr. Keith Johnston, and Mr. Harvey, the President of the Royal Scottish Academy, are grouped in three of the subjects. Dr. John Alexander Smith, Secretary of the Antiquarian Society of Scotland, is introduced appropriately with a building he knows so well; in one case along with the inscribed tables he has written a paper upon. In one or two instances we have attempted to add the charm of youth and beauty in contrast to the mouldering walls erected centuries ago.

There are said to be sixty-eight niches for statues in the building. In the interior there are still statues of Peter and Paul in good preservation; this is probably owing to their being placed in situations difficult to reach. There are also two statues on the exterior—a Virgin and child, and St. Andrew. As the Abbey was dedicated to St. Mary, the niche in which the statue of the Virgin is placed is the most elaborate of them all; it is a little temple, in which designer and carver have used all the resources of their art. The Virgin holds a bouquet in her right hand, carefully carved; in her left arm she carries the infant, who seems to have borne a lamb in his arms. These details cannot be seen from the ground, but are rendered in our photograph, which was taken close to the image. As there are but few specimens of sculpture in Scotland of this period, we copied those statues with great care, though they were very difficult to reach.

When I mentioned to friends that I intended to go to Melrose Abbey to take a series of negatives, the general remark was, Why go to a place like that, which everybody has done? Well, I have gone there, and with Mr. Smith's assistance have brought back upwards of a hundred negatives. Though Melrose Abbey is perhaps the most hackneyed subject in Scotland, I may fairly claim that we have produced a series of views distinguished by novelty and originality. An architect may, perhaps, be able to study the building almost as well from our photographs as if on the spot, owing to our having raised scaffolding at all the points of greatest interest, so as to be able to see and copy the various details with the greatest distinctness.

The photographs are all on plates 11 by 9 inches. We chiefly used the Nos. 2, 3, and 4 triplets of Dallmeyer. The day before I left Melrose, Mr. Dallmeyer most kindly sent me the first specimen he had made of a new architectural lens, to include a very wide angle. We found that this lens would enable us to take a new set of subjects that could not be done by any other lens in my possession. As the focus was too short to be conveniently worked by the cameras we were using, I am having the body of a camera made to suit it, and as soon as this is ready we shall again go to work at the Abbey. I believe that this lens will be of the greatest value in the class of subjects to which I have been directing your attention this evening.

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PROOF THAT PURE IODIDE OF SILVER IS ALWAYS SENSITIVE TO LIGHT.

BY M. CAREY LEA.[*]

There is a very ingenious theory as to the cause of the sensibility of iodide of silver, which has been of late ably advocated by my friend, Dr. Vogel, and which is very captivating by the simple explanation which it affords of the phenomena of the latent image upon mere chemical principles. This theory may be briefly stated as follows :—

1. Pure iodide of silver, isolated, is insensitive to light. It is never sensitive, unless there is some substance present capable of combining with iodine.

2. When nitrate of silver is present in excess, it is capable of taking up the iodine liberated by the action of the sunlight. This free nitrate may be replaced by substances capable of combining with iodine—as tannin in its various forms, chloride of tin, and many other substances.

There presents itself at once a most formidable objection to this theory; that it assumes a fact, and then reasons on that assumption. It assumes that iodide of silver is, when pure, insensitive, and then explains why certain substances impart to it a sensitiveness. But I deny the original assumption, that pure iodide of silver is insensitive; I affirm that it is sensitive, and offer incontrovertible proofs; and when I examine the argument on the other side, I cannot find that any experimental proof is offered for this alleged insensibility; it seems to be taken for granted, in the face of the clearest facts. If it were said that iodide of silver was moderately sensitive, and that these substances acted as accelerators, the position would be more tenable But it appears that the positive incapacity of pure iodide of silver to receive a latent image when alone is the base of this theory, and that it must stand or fall with it.

This alleged insensibility of pure iodide of silver seems in some way to have been received into photography as an admitted fact, and to have been accepted as such without comment, though endless discussions have been carried on as to why it should be so. Indeed, according to some views, such a thing as pure iodide of silver seems to be hypothetical, and an excess of something or other may always be presumed in it, without test or proof!

I became some time since convinced that this insensibility, generally admitted as it was, had no existence except on paper, and I made last winter a connected series of experiments to demonstrate the correctness of my views, which experiments were published in May last. They consisted of a series of many experiments, in each of which some new safeguard against error was introduced, until I reached a point which seemed to leave no loophole for reasonable doubt.

The last of this series of experiments I wish to quote briefly here.

Nitrate of silver was dissolved in plain collodion, and a plate was coated with this collodion. This plate was plunged into a bath of aqueous solution of iodide of potassium, and left in it a very long time. So much nitrate of silver had been dissolved in the collodion, that in the iodide of potassium bath, the iodide of silver formed, burst out from the film, and formed a layer on its surface, holding on to it sufficiently to admit of gentle washing. The plate, then, having been gently but thoroughly washed, was exposed for a few seconds under a negative, and the resulting image was readily developed in the usual manner—the iodide was then sensitive, whilst there was present no substance whatever to which the power of combining with iodine could be attributed.

Now, the fact that this can be done has never been called in question, nor the argument deduced from it disproved. It appears to be, therefore, reasonable to claim the principle which follows from this series of uncontradicted experiments as an established one, which cannot be passed over, but must either be controverted, or otherwise explained, before any theory inconsistent with it can be reasonably advocated.

It does not, however, seem to be thought so. Some seem still to believe that iodide of silver may be insensible; and I observe that Mr. G. Wharton Simpson, in an interesting editorial in his Journal, on the general subject, seems to hold to the theory above referred to. The general scope of the article referred to is, indeed, the question between the physical theory and the chemical—a question which is only incidentally connected with that with which I am at present occupied, and to which I shall not refer here, but come back to at a future time. The point here is simply, Is pure iodide of silver sensitive to light? Or, Is it necessary that, as the theory which I am endeavouring to controvert asserts, there must be some foreign substance capable of combining with iodine present, in order to give rise to a sensitiveness in the iodide?

If it were simply alleged that that these sensitizers *exalted* the sensibility of the iodide of silver, there could be no argument at all; indeed, no fact in photography is more patent than that. But it is not so alleged. It is affirmed that the sensibility to light depends upon the presence of a foreign body of the nature in question, and only exists when that foreign body is there to attract the iodine.

I determined, in the month of August last, to institute some experiments which occurred to me, and which must, as it appeared to me, settle this question finally. I was prevented from making these experiments until the month of October, and had just finished them, but not written them out, when I received the Photographic News of September 8, containing the well-written editorial to which I have above referred.

New Experiments.

In all the experiments which have been hitherto made on iodide of silver prepared in the moist way, it has been prepared either in the presence of excess of silver salt, or of the alkaline iodide, and it was, therefore, easy for those who called in question the results argued from the experiment, to assert that the silver salt or the potassium salt, as the case might be, remained in an excess which could not be removed by washing. This is a sort of theory that no one has a right to assert without analytical proof, which latter was not forthcoming, although it is certainly he who asserts the presence of an impurity who is called on to prove that it is there.

My experiments of last spring disposed, I think, of this view, but I now determined to adopt a course which would put any such assumption out of the question, and also to have no foreign body whatever present. I accomplished this in the following manner :—

On some plates of clean glass, I produced clear, bright specular films of metallic silver in the same manner as is used for silvering glasses for optical purposes, viz., by the action of Rochelle salt on ammoniacal nitrate of silver. These films are dense and metallic, set themselves in absolute optical contact with the glass, and adhere well enough to permit of thorough washing under a steady, rapid stream of water. They were all so washed for at least an hour each.

We have here, then, nothing but glass and pure metallic silver—no possible suspicion of an impurity, organic or inorganic.

These plates were then cut up into pieces of a convenient size, and were plunged into a solution of iodine in weak alcohol. They almost instantly blackened, and then gradually passed to the yellow colour which indicates complete iodization. It is rather remarkable that, whilst two or three seconds were sufficient for the blackening by formation of subiodide, half an hour or thereabouts was requisite for the complete conversion into neutral iodide, so long does it take for the action of the iodine to penetrate the film.

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[*] *Philadelphia Photographer.*

In order to insure that not a trace of metallic silver should be left, the immersion of the plates was prolonged for an hour and more. The transparency of the glass rendered it easy to observe if the film was iodized all the way through. The change, from the brilliant dark specular surface of the metallic silver to the light yellow granular film of iodide, is too striking and conspicuous for any one to be left in doubt on this point; and even were it not, it is impossible to suppose that a thin film of metallic silver could be for an hour in a solution of iodine without being completely iodized thereby.

In fact, the silver film, by its conversion into iodide, lost its adhesion to the glass, and the manipulations became to the last degree delicate and difficult. The films got loose, broke up, and slid about on the surface of the glass to that extent that it seemed almost impossible to carry out the experiment. By care and patience, the pieces of glass were got out of the iodine solution with enough of the film remaining attached to work with. By slipping these cautiously into a basin of water, constantly renewed by a gentle stream, they were washed slowly, but thoroughly. By further management the plates were got out of the water, and finally dried. About two-thirds of the film was in this way lost, but a sufficient number of good, smooth, uniform pieces were obtained to continue the work with.

These pieces were exposed under a strong negative for a few seconds to diffused light. They were then carried back to the dark room, covered with solution of pyrogallic acid, nitrate of silver, and citric acid. Here, again, the utmost difficulty was found in preventing the films from breaking up the moment they were moistened. With care, however, the solution was got over them, and bright, sharp, and clearly defined images were developed.

This demonstration, I am inclined to think, will be found unanswerable. Where a collodion film or paper is made the vehicle, there is always at hand the easy and ready objection of "organic matter." Again, in the case of the Daguerreotype, there is the metal back. It can be alleged (and has been so stated by Mr. Hunt, and may quite likely be true), that the metallic silver behind the iodide acts as "sensitizer," by taking up the iodine eliminated; or if the iodizing has penetrated through the whole thickness of the silver plating, there is still the copper back conveniently ready for the iodine.

But, in my experiment, nothing of this sort can be alleged—there is iodide of silver loose, inconveniently loose, upon a glass plate—nothing organic, nothing metallic, nothing capable of taking up iodine, nothing upon which the most argumentative of reasoners can hang an hypothesis. And the iodide is sensitive, unmistakably so. Where iodide of silver is exposed to light in tubes, and then a developer applied in a dark room, there may be questions of differences of shades, and whether the powder is a little darker.

But when one has developed, as I have, an image of engraved lettering, and has read the letters and words bright, clear, and sharp, upon the iodide film, he does not, and cannot, entertain the least doubt as to whether the iodide was sensitive or not.

Influence of Alkaline Iodide.

One of the views that has been persistently urged in theoretical photography is that—

1. Iodide of silver formed in presence of an excess of alkaline iodide attaches to itself an excess of the iodide, which renders it insensible.
2. This excess of iodide cannot be removed by any washing.

I have never been able to hear of any satisfactory experiments in behalf of this latter point, but have always regarded it as an unsupported hypothesis, made to explain supposed facts which themselves had as little existence as the supposition resorted to, to explain them.

Experiments which I published last spring seemed to me to dispose of this matter finally, but some new examinations lately made will put the matter in a still clearer light. First, I wish to cite one of the experiments above referred to.

A piece of paper was imbued in nitrate of silver, dried, and then steeped in a solution of iodide of potassium. It was then simply blotted off with blotting-paper. In this state, whilst still moist, and of course having present an abundant excess of iodide of potassium, it was exposed to light under a negative, and proved, as was of course expected, perfectly insensitive to development. But another piece of the same paper, instead of being simply blotted off, was thrown into water, and well washed under a tap. Then, being exposed as in the previous case, an image was readily developed on it. Here was proof positive—

1. That the presence of an excess of iodide of potassium renders iodide of silver insensitive, a fact which has never been denied.
2. That, by simple washing, the paper recovered its sensitiveness.
3. That it follows that any excess of alkaline iodide which may be present is not combined with the iodide of silver, but may be easily washed out.

This appears clear, plain, and unanswerable. But as the contrary opinion does not seem to have been wholly abandoned, it occurred to me that the course of experiment described in the foregoing part of this paper might adapt itself to a beautiful verification of the ideas which I have been maintaining.

I therefore proceeded as follows:—

Pieces of the silvered glass were plunged into a solution of iodine to which a notable quantity of iodide of potassium had been added. Here, then, was iodide of silver formed in presence of iodide of potassium, and in entire absence of any other substance whatever upon which a disturbing agency could be charged. No experiment could be clearer, no conditions more sharply defined.

The films of iodide, after having been submitted to a very lengthened exposure to the liquid, were taken out and washed. As in the previous experiments, the most delicate and careful manipulation was required to keep these films in existence at all, through the various treatments to which they were subjected; but with attention and patience, this was always accomplished. The films broke, and parts would wash away, but enough was always preserved to render the experiments decisive

After these plates had been thoroughly washed and dried, the following trials were made:—

1. A film was exposed under a strong negative to a diffused light for seven seconds. It developed with pyro, citric acid, and silver without difficulty, giving a bright clear image.
2. A similar piece was exposed under same negative for two seconds to a strong diffused light, almost amounting to a faint sunlight. Developed, as before, with a similar result.

There were no failures, nor unsuccessful trials, no coaxing, nor effort necessary. The images, in each case, came out in a very few seconds, and were bright and distinct. As in the previous experiment, a negative of engraved work and lettering was selected, because such images offer clear, sharp contrasts of white and black that admit of no doubt as to their presence—they are either there clear and bright, or else wanting altogether.

I think I may now, without presumption, claim that these experiments settle the question as to the sensitiveness of pure iodide of silver. It is a point of view in which I have stood almost alone, the entire weight of opinion having been against me. But the results above described seem too decisive to be rejected, and if they are accepted, some of the favourite theories of the day must be materially modified.

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Talk in the Studio.

Developing Powders.—We have recently made a further trial of Ramsden's developing powder, made in accordance with his instructions, and find the results in every way excellent. The solution is energetic, and gives a rich, clean, delicate negative, with a fine bloom, without tendency to hardness, fog, or other defect.

The Stability of Gun-Cotton.—In a recent lecture at the Royal Institution, Mr. Able, of the Royal Arsenal, stated the results of various experiments, extending over three years, for testing the keeping qualities of pyroxyline. He had come to the conclusion, notwithstanding the suggestions of decomposition, &c., which had been made on the Continent, that it was the most stable vegetable substance with which he was acquainted, remaining in good condition in circumstances which decomposed and rotted wood. It might even be kept damp for any length of time, and, when dried, was found as good as ever. Such evidence sets aside all the prognostications of alarmists as to any want of stability in collodion films.

The Sloping Front-light and Tunnel.—Amongst the numerous expressions of opinion we have recently received on this subject, we have received a very practical one from Mr. J.

B. Forster, of Manchester, in the shape of photograph of Mr. Rejlander at work. Mr. Forster has a studio of the form referred to,—sloping-top-front light and tunnel. Mr. Rejlander, whose name has been mentioned as approving this form, is illustrating his appreciation of it by photographing a couple of children *outside* of the studio under a canopy of canvas, which he has improvised to regulate the light, merely making use of the outside glass-room to attach and support his framework! The light inside had evidently been insufficient and unmanageable. Mr. Rejlander recently remarked to us that, with a light framework and a piece of canvas, he could generally improvise a studio in which he could get more command over the light than in many of the glass-rooms built for the purpose.

Brinckeroff's Patent Porcelain Paper.—The paper to which Mr. Anthony called attention a few months ago, and which was then just patented, is prepared, it appears, with a white pigment and gelatine, afterwards rendered insoluble by alum or tannin. An abstract of the specification is as follows:—"The object of this invention is to produce a surface upon paper or other material that is of a fine cellular character, adapted to the reception of photographic or other pictures, or for other uses in the arts. The patentee makes use of a thin solution of gelatinous materials, and kaolin or terra alba, which he prefers to employ hot, which solution penetrates the pores of the paper or other materials being prepared. He then submits the said material to the action of an astringent, such as alum or tannin, which, combining with the gelatinous material, forms a fine cellulose surface that is insoluble in the solutions employed in photography, and which, penetrating the pores of the paper, fills them, and also produces an even smooth surface by enveloping and holding down any fibres that otherwise might stand up on the surface of the paper."

Nitro-Glycerine.—Professor Seely relates in the *Scientific American* the details of his search into the cause of a recent explosion of nitro-glycerine in New York, in which he controverts the idea that the explosion is due to percussion. He regards the cause as spontaneous combustion, similar to that occasionally known with gun-cotton, the result of confining it in a close box when rather acid. He adds:—"We cannot afford to allow a substance so useful as nitro-glycerine has proved itself to remain unused; we cannot confess that our science and inventive skill are unable to find the means of making it safe. I venture to predict that, in a short time, nitro-glycerine will be esteemed far less dangerous than gunpowder, and that, in a great measure, it will supersede it; within a few years the annual consumption of nitro-glycerine in the United States will reach a million of pounds. Gun-cotton was at first looked upon with as much dread as is now nitro-glycerine; the accidents from it were quite as terrific as those from nitro-glycerine, and they were also then quite inexplicable. I quote a few cases. In 1847, the gunpowder factory of Hall Brothers, in England, where they were making gun-cotton, blew up, killing every man at work in the place. On the 17th day of July, 1848, a similar explosion of over 3,000 lbs. took place at Bouchet, near Paris; walls from eighteen inches to a yard in thickness were reduced to powder from top to bottom, and heavy weights were thrown to a great distance. An explosion took place in a magazine at Vincennes, which no one had entered for several days previously. An explosion of 300 lbs. took place in Connecticut under precisely similar circumstances. But lately what a change! Wherever there is a photographic artist you may find gun-cotton. It has been manufactured in all quarters of this city. I have myself made tons of it. During our late war, thousands of pounds were sent by Adams's Express from this city to a neighbouring State, and the business was conducted in such a way that there was less risk from fire than in the ordinary handling of dry goods. It is only to our ignorance that such things appear dangerous; whenever we are fore-warned we must learn how to be fore-armed." Gun-cotton is much more safely kept when left in a jar loosely covered, than when packed in a stoppered bottle or air-tight case.

Engraving upon Glass has hitherto been, not unfrequently, effected by the use of fluoric acid, which often produced dangerous wounds, when by accident it came in contact with the skin of the workmen. M. Henri Sainte-Claire Deville has recently exhibited to the Academy of Sciences of Paris some very fine examples of glass engraving executed by means of a solution of the fluoride of calcium in hydrochloric acid, with which there is no such danger. The results obtained by this method are said to be exceedingly satisfactory.

Waterproof Enamel for Card Photographs.—The following process for enamelling cards is a very good substitute for the collodion transfer process, and is much easier of application. First apply to the surface of the card, with a brush, a solution of gum arabic in water, of sufficient strength to give considerable gloss when dry. As soon as dry, apply a coating of plain collodion in the same manner as coating a plate. If the collodion is not very tough, two or three coatings may be applied to advantage. Finish by passing the card through a roller, and you will have a fine gloss. Care must be taken not to have the gum solution too thick, or the surface will crack when dry, though there is but little danger if the collodion is applied soon after the gum is dry. Gelatine, instead of gum arabic, answers the purpose well, though it gives hardly as much gloss. Perhaps you or your readers may have a better process than this. If so, let us have it.—*Philadelphia Photographer*.

To Correspondents.

Photographic Piracy.—In reference to a complaint in Lambeth Police Court, some time ago, in which a charge of piracy was preferred against a photographer for the piracy of a portrait of Lord Brougham, in which the decision was for the defendant, Mr. Bali writes to us that a point in the evidence, upon which we commented as singular, was incorrectly reported; and that his actual evidence was that he had *not* supplied the pictures in question. The word not was omitted in the report in the daily paper from which we quoted.

Z.—The temperature would not prevent the precipitation of chloride of silver. It is probable that in the jar of washing waters an excess of chloride of sodium has been added, and a solution of an alkaline chloride has the property of holding a certain amount of chloride of silver in suspension. It is possible, also, that a little cyanide may have got into the jar, which would hold some of the silver in solution. Cleanse your jar, and then begin *de novo*, using care, and watch carefully the result.

D. Hornby.—The project is a useful one, and we shall have pleasure in aiding it. We have not space to print the letter in full, seeing that it has already appeared in another journal.

Bosworth.—The cockling of the paper during the process of enlargement is due to its partial drying. Maintaining a damp, cool atmosphere, or placing a sheet of damp paper behind the sensitive paper, will best obviate this difficulty.

Lux et Salus.—The lighting appears to be very good. Thanks.

W. D. B.—We are unable to help you to a certain remedy for the mottling of the skies in your tannin plates. Do you keep the plate in motion whilst developing? Allowing the solution to remain without any motion on the plate will sometimes cause markings on the sky. Sometimes the use of a horny new collodion, which does not allow the tannin solution to permeate the film readily, will conduce to markings.

Q. Q.—The time of printing required for collodio-chloride of silver has always been, in our experience, just a little less than is required for albumenized paper printing. Where a longer time is required, there is some fault in the preparation. In some cases, where it is prepared with much excess of nitrate of silver, a decomposition arises, if it be kept long, from the action of the silver salt on the collodion.

A. K. Sparke.—We have not yet received the specimens said to have been sent off. We look for them with interest.

T. W. Ashforn.—The lens you are using is not suitable for producing card pictures, the focus being much too short. It is only intended for stereoscopic views. Whether the lens be perfect of its kind or not we cannot tell; but, in any case, it is not well suited for standing card figures.

C. H. Free.—Thanks. You will find an article on a similar subject in our third volume.

Geo. Greatrex.—We shall have pleasure in trying an example of your accelerator, and report on it. We frequently produce negatives, however, without any after intensifying.

B. L. P.—A spirit varnish is generally harder than the varnish called "crystal." The latter is generally made of gum dammar dissolved in benzole. With care, it is quite possible to revarnish with a spirit varnish.

D. R.—The developing boxes in which the arms are placed through sleeves are suitable only for working small plates. It would be difficult to produce 10 by 8 negatives by such an arrangement.

S. M E.—A slight rinsing with distilled water, so as to remove the bulk of the free nitrate, is desirable; the use of common water at first is apt to produce irregular action, by the formation of irregular patches of carbonate or chloride of silver.

Pyro.—So far as we know, the lenses are tolerably good, but we have not had sufficient experience with them to enable us to state that all the claims made for them are strictly true.

M. A. G.—Cotton velvet makes an excellent curtain. Repps is also a good material. Light green, dark blue, or brown will answer for colour.

Several Correspondents, and several articles already in type, in our next.

Erratum.—"Rapid Albumen Process," page 231, second column, line 21 from the top, for "Wash and again apply developer No. 5," &c., read "Wash and again apply developer containing No. 5," &c.

Photographs Registered.

Mr. J. Brattie, Clifton,
Four Portraits of Bishop Anderson.
Mr. Thomas Seen, Bristol,
Photograph of Hon. T. M. Wilde.
Photograph of M. D. Hill, Esq., Q.C

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 404.—*June* 1, 1866.

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REMOVAL OF HYPOSULPHITE BY PEROXIDE OF HYDROGEN.

Pending some further experiments, we have pleasure in submitting to our readers the results of an examination of the action of peroxide of hydrogen in eliminating the final traces of hyposulphites from washed silver prints, made by our friend Mr. J. Spiller, of the Chemical Department of the Royal Arsenal, Woolwich, whose able researches into the stability of silver prints are well known to the photographic world. His experiments were made with the peroxide of hydrogen supplied by Mr. Robbins, which contains ten volumes of oxygen, and is very pure. The results are described as follows:—

"The peroxide, diluted ten times (*i. e.*, containing one volume of oxygen), quickly converts hyposulphite of soda into the *sulphate*, without apparently stopping short at the hyposulphate ($S_2 O_5$) stage.

"Of this strength the peroxide effectually removes all traces of hyposulphite lingering in an imperfectly washed print (whether on plain or albumenized paper); but, inasmuch as the peroxide is not so volatile as water, and traces of sulphate have to be extracted, it would always be advisable to give the print a short supplementary washing.

"The peroxide has not, however, the least effect in removing the traces of silver united with the albumen, so that the permanence of the proofs printed upon such a basis is on no better footing than before.

"A slight bleaching action is the result of immersing the proofs in the peroxide of hydrogen, and for the reduction of over-printed copies I should say such a method presents manifest advantages, since it would be impossible to leave any trace of an active solvent in the pores of the paper after drying.

"More highly diluted solutions of the peroxide have been tried; their action is of course more gradual, and sometimes decidedly slow, but they must be used both from motives of economy as well as from the necessity of avoiding a disastrous solvent action."

In another communication Mr. Spiller adds:—

"Regarding the question whether the sulphate of silver, or the double hyposulphite of silver and soda, should be more easy of removal from the paper by washing, I conceive that with *pure* water there would be very little difference; but there is another phase of the question which may already have occurred to you, viz., the transformation of the soluble sulphate of silver into chloride, by the impurity of the washing water. Supposing an ordinary finished print retained a trace of common salt from this source, dried into the paper, then, upon treatment with peroxide of hydrogen (itself containing a minute quantity of hydrochloric acid, or this chemical substance to have been diluted, for use, with common water), the action would not be so direct or simple as we have assumed, for at the instant of the production of the sulphate of silver, a portion, if not the whole, of this salt would be decomposed by the chloride of sodium; and thus, with the destruction of the alkaline hyposulphite, a failure in the removal of silver must be the inevitable result. To overcome this objection it would be necessary to wash the prints, once at least, in pure water; then to submit them to the peroxide of hydrogen, purified from traces of chloride of hydrogen, HCl, and diluted with pure water; and, finally, to wash with distilled or pure rainwater, to remove the sulphate of silver. Unless these precautions be taken, I should incline to the opinion that no advantage on the score of greater permanence would be secured by the use of the peroxide, since the silver would be left in the print in a more objectionable form, alterable not only by the decomposing albumen, but by mere exposure to light."

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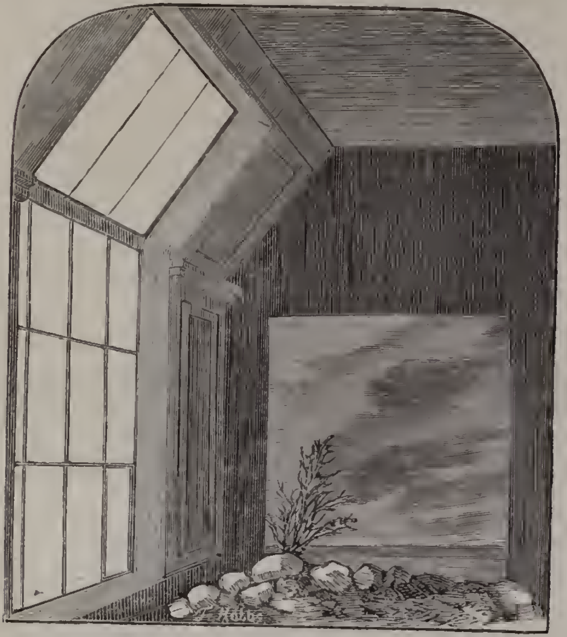
OUT-DOOR PHOTOGRAPHS TAKEN IN THE STUDIO.

Our excellent contemporary, the *Philadelphia Photographer*, issues, as the illustration of its last number, one of the most charming little pictures we have seen for some time. The photograph is by Mr. Notman, of Canada, whose admirable pictures we have repeatedly had occasion to mention. The subject is entitled, "A Chance Shot," and illustrates a Canadian hunting incident. A wintry snow-covered landscape, with dark-tinted sky, low white storm-clouds driving over the horizon, forms the scene of operation. Kneeling down, with fur cap and well-wrapped figure, is the huntsman, his rifle resting on the antlers of cariboo, which he has just killed, but of which only portion of the head is seen. Behind the huntsman, and looking over his shoulder, is another figure. Both are watching intently for the game, which is evidently just coming within range, to give opportunity for the chance shot. The composition of the picture, the intentness of the figures upon their sport, their unconsciousness of picture-making, the *vraisemblance* of the landscape effect, and the excellence of the photography, all combine to produce a most admirable picture.

This picture is one of a series which Mr. Notman has recently produced, and which is described by our contemporary as "out-door photography taken in-doors." Perfect as is the open-air effect of foreground, middle distance, and extreme distance, and that in a snowy landscape, without suggesting a suspicion of artificial work, all this, it appears, is done in the studio, and is the result of fine taste, judgment and skill, in securing and arranging suitable accessories. "To make these pictures," our contemporary remarks, "trees, rocks, snow, tents, air, light, fire, men, backgrounds, cariboos, had to be brought in and arranged to suit the subject chosen for the picture."

The photography and the lighting is not less admirable than the grouping and composition. The form of studio and arrangement of light seem excellent. The diagram, which we reproduce, indicates a mode of lighting which will often be found most successful in ordinary portraiture.



It is described as follows:—

"The light is due north, and, in making sittings, the sitter usually faces the west. In this way either side of the face may be taken, as the operator sees best. It is used specially for such pictures, we believe. It is 34 feet 6 inches long, 18 feet 6 inches wide, and 16 feet 6 inches from floor to ceiling. The side-light is 9 feet wide, and 10 feet 6 inches from the floor to the inclined top-light. The latter is 9 feet wide and 5 feet inclination, or in depth from the top of the side-light to its own highest point. The figure shows the kind of background used, though that may be more plainly seen in our picture."

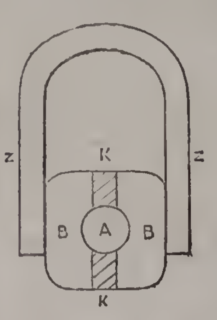
APPLICATION OF THE ELECTRIC LIGHT TO PHOTOGRAPHY.—IMPORTANT DISCOVERY.

Mr. Woodbury informs us that he has been, during the last few months, making some experiments with the electric light for photographic purposes with the most complete success, and at a cost which brings the light readily within commercial consideration. The chief difficulty in the way of employing the electric light for photography, the actinic qualities of which are well known, has hitherto been the enormous cost of battery power. By a recent discovery made by Mr. Wilde, of Manchester, to which we have before referred, this difficulty is entirely removed, the generation of electricity in very large quantities being now cheap and simple. Mr. Woodbury has employed the light for the production of the gelatine reliefs employed in obtaining his printing plates, and secures, by a direct exposure of an hour, the same result he before obtained in an exposure of an hour and a half to sun-light, using the solar camera. He estimates that for about ten pounds a year, exclusive of the cost of carbon points, a constant powerful electric light may be maintained all the year round for printing purposes. As a number of printing frames could be arranged around one light, it is manifest that it might be employed economically when sun-light fails; and it is even possible that, in processes where a light of constant intensity was necessary, so as to measure exposures accurately, such a source of light might even be used in place of a variable sun-light. The drawback to this cheapness is that it can only be satisfactorily secured where machine power is accessible, the electricity being generated, not by a battery, but by the rapid revolutions of an armature in an electro-magnetic machine. In large manufacturing towns, power from a steam engine can be hired at a moderately cheap rate; but where this cannot be done, this application will be more costly.

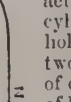
We extract from our contemporary, the *Engineer*, an account of Mr. Wilde's invention, which it describes under the head of "A Splendid Discovery in Electricity:"—

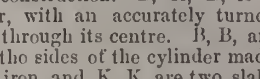
"One of those great discoveries which are only made at long and rare intervals was communicated, as it should be, by the veteran philosopher, Professor Faraday, to the Royal Society at its ordinary meeting a short time since. The discoverer of the principle, and the inventor of the first machine to which it has been applied, is Mr. H. Wilde, of Manchester, whose paper on the subject was presented by Mr. Faraday. The new apparatus generates electricity of great quantity and intensity, and is far more powerful in this respect than the battery of Grove or the large magneto-electric machines used in the recent experiments in lighthouses. In fact, it is the most powerful generator of such currents that has yet been constructed, and will melt lengths of iron rod and copper wire, besides giving light of unprecedented brilliancy, when two thick carbon rods are used as electrodes.

"In the course of some experiments with a magneto-electric machine of somewhat peculiar construction, Mr. Wilde discovered that if the induced current from the armature were made to pass through the coils of an electro-magnet, that magnet attained more than four times the lifting power of the permanent magnet whence its force was originally derived, in opposition, apparently, to the law of 'the conservation of energy.' To use the words of Mr. Wilde—'Having discovered the fact that a large amount of magnetism can be developed in an electro-magnet by means of a permanent magnet of much smaller power, and as definite quantities of magnetism are accompanied by the evolutions of proportionate quantities of dynamic electricity, and since an electro-magnet when excited by means of a voltaic battery possesses all the properties of a permanent magnet, it appeared reasonable to suppose that a large electro magnet, excited by means of a small electro-magnetic machine, could, by suitable arrangements, be made instrumental in evolving a proportionately large quantity of dynamic electricity, notwithstanding the pulsatory character of the electricity transmitted through the wires surrounding the electro-magnet.'



"At the beginning of his experiments Mr. Wilde made a little magneto-electric machine, of which the accompanying cut will explain the principle, though not the actual construction. B, K, B, is a cylinder, with an accurately turned hole A, through its centre. B, B, are two of the sides of the cylinder made of cast iron, and K, K, are two slabs of brass separating the iron sides from each other, the slabs and sides being held firmly together by brass screws. Z, Z, is one of five or six permanent magnets, which can be placed over the cylinder B, B, the magnets all biting the sides of the cylinder, and making good contact. These iron sides become, therefore, the poles of a strong magnet, increasing in power as one magnet after another is placed over the cylinder. An armature is made to revolve inside the hole A, and two large grooves have to be cut in the sides of this armature Y, the wire being wound over it longitudinally, as at M, N. It is evident that when this armature is made to turn rapidly in the hole A, its magnetism will be reversed twice in every revolution, and that its surrounding wire will give off electrical currents, as with a magneto-electric machine of the usual form. The armature was driven at the rate of 3,000 or





less revolutions per minute, by means of a small steam engine. It would thus give off 6,000 waves of electricity, each alternately in opposite directions, but a commutator of the usual construction attached to the machine would send these all in one direction when desired.

"In one of the earliest experiments with this apparatus the wires of the armature were connected with a taugent galvanometer, to measure the amount of electricity evolved. One magnet, weighing about 1 lb., was first placed on the cylinder, and three other magnets of the same size were added in succession. It was found that the amount of electricity given off was directly proportional to the number of magnets on the cylinder. When the electricity obtained from one of these four permanent magnets was made to pass through the coils of an electro-magnet, the latter lifted nearly four times the weight of the former. This induced Mr. Wilde to make a second cylinder, and place it in contact with electro-magnets excited by the first machine, a very powerful current being the result. Lastly, he added a third machine, with a cylinder of 10-in. internal diameter, and when the three pieces of apparatus were connected together and the armatures made to revolve, the quantities of electricity far exceeding that obtainable by any other means hitherto used were given off.

"The illuminating power of the current thus obtained was of the most splendid description. Two carbon electrodes half-an-inch square were placed in the holders of the electric lamp, and a parabolic reflector was fixed so that the rays should diverge at a considerable angle. With this arrangement placed on the top of a lofty building, 'the light evolved from it was sufficient to cast shadows from the flames of the street lamps a quarter of a mile distant upon the neighbouring walls.' When viewed from that distance the light was a magnificent object to behold, having all the rich effulgence of sunshine. The calorific power of the current was so great that it melted pieces of cylindrical iron rod, 15 in. long and ¼ in. diameter. It melted 15 in. of No. 11 copper wire 0·125 of an inch thick, and with another arrangement of the armatures melted 7 ft. of No. 16 iron wire, 0·065 of an inch in diameter, and made 21 ft. of the same wire red-hot. The most remarkable fact of all is, that the primary permanent magnets weigh only 1 lb. each, and the current they give is insufficient to melt the shortest piece of iron wire, yet by the intervention of electro-magnets, as described, a current of extraordinary power is produced.

"The third machine made, which was the largest, had a cylinder with a 10-in. bore. The whole machine is only 80 in. in length, 24 in. wide, 60 in. high, and weighs 4½ tons. The smaller cylinders of the other machines were 2½ in. in diameter. The whole of them, therefore, occupy very little space, and although they are heavy, the only moving portions of them are the armatures. The invention, therefore, seems likely to be of special value for lighthouse illumination, and for other purposes which as yet it is impossible to forsee."

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The Dry-Plate Battle—The New Group Lens—Joseph Durham, A.R.A.—The Portraits at the Academy—Indian Photographs—Peroxide of Hydrogen—Discovery of Hyposulphite Fixing—The Landscape Season—The Societies.

It was a happy idea of Mr. Gordon's to collect together the great masters of all the dry-plate processes who were within a reasonable journey of his hospitable mansion, to expose their plates simultaneously, and to compare results. The competitors were certainly the most able men in their several departments that could be got together; the weather was all that could be wished; and, what is most gratifying to the "Old Photographer," the results proved, beyond all doubt, that those processes which he has always advocated, the collodio-albumen process and the Fothergill, with its modifications, totally eclipsed other competitors. It was proved that the Fothergill process (Gordon formula) was at least two-thirds quicker than the most sensitive tannin plates, the development was clean, easy, and quick, compared with the tannin. I am aware that some few photographers continue the use of this process, who, by patience and skill, endeavour to combat its uncertainties; but I think the time has now come when it will be consigned to that limbo of worthless processes which is already crowded with the abortions of those whose ambition it has been to invent a process.

As there is some danger, amidst the various dry processes constantly brought forward, of the amateur not knowing which to select, I would strongly recommend a beginner, or those numerous photographers who are giving up the use of tannin, to take the improved Fothergill, as described by Mr. Gordon in the News for May 4, or the collodio-albumen, as described by Mr. Mudd in the pamphlet he is about to issue, and to resolutely stick to one or the other, and not be led from it by any persuasion whatever.

A photographer may have a perfect knowledge of the minute difference that may be occasioned by a drop more or less of acid in his bath; he may be perfectly certain that gelatine is no improvement to his developer; he may know what to do with top-light and side-light; he may know the meaning of the word astigmation, or what is expressed by the symbols $SO^4 + PbO\ C_{12}$; he may even know the "awe-inspiring mysteries of art;" but, after all, the beauty of his pictures very much depends upon the tools the optician supplies him with. I have been very forcibly reminded of this by using a new portrait and group lens Mr. Dallmeyer has just introduced. I know, in a small way, a few of the things I have mentioned in the beginning of this paragraph. I have used lenses of extravagant price, but I have never produced pictures that pleased me half so well as those I have lately taken with this new lens. It really does cover a plate much larger than it professes to do, and it does this equally, not, as was the case with the old portrait lenses, brilliant focus over a small space, and the rest chaos, but it gives equal distribution everywhere—not opticians' focus, learnt from their experience with the microscope—but painters' focus, and this with half the exposure of the old combination. I, in common with all photographers, owe Mr. Dallmeyer a debt of gratitude for this, as well as for several other lenses (the triple and wide angle, for instance), and wish I was rich enough to remember him in my will.

In the April "Echoes" I asked the question, "When will photographers be admitted into the ranks of the Royal Academy?" and gave one or two reasons why they should, but did not expect it during this century. If photography is not recognized by the Academy, it has, at least, admitted one of the Council of the Photographic Society into its body. At the meeting held on the 8th of May, Joseph Durham, Esq., who has been for a long time a useful and esteemed member of the Council, and whose speech at the February meeting, on the use of photography to artists, must be remembered by everybody, was elected an Associate. To be chosen from a large body of artists to receive an honour given only to the greatest in art, must be a source of gratification to Mr. Durham, and to all who know his worth, either as an artist or as a friend.

If photographers do not reach the level of art, as Mr. Cocking suggested in his paper, read at the meeting of the South London Society, then painters are sometimes in the same position. This might easily be seen by a visit to the Royal Academy. A glance at the portraits contained in this collection will be sufficient. In composition, light and shade, expression, and especially in likeness, only one or two will be found to be better than good photographs. The great value of the two best portraits in the exhibition—Dr. Quain, by Maclise, and Mrs. Guthrie, by Leighton—is that they compete with photographs in effect. On the other hand, look at the portraits of Tom Taylor, by Fleuss, and Arthur Lewis, by O'Neil, then try and remember if you have ever seen anything worse in the commonest cartes de visite. I looked carefully over the Academy portraits for the purpose of getting a few hints for backgrounds, &c., but could not find one that I thought worth bringing away. Those treated with plain backgrounds had, in my eyes, generally the best effect; others, with the old traditional, unnatural landscape backgrounds, defying nature, may still be seen; while one or two painters have rivalled the most lavish photographer in the use of accessories; and we have backgrounds—

> "Where everything exclaimeth, 'How severe!'
> 'What are we?' and 'What bus'ness have we here?'"

Speaking of portraits reminds me that English portraitists must look to their laurels. A few days ago I had the pleasure of a visit from a photographer who has made himself famous in another part of her Majesty's dominions, Mr. Schwarzchild, of Calcutta. He brought with him some large portraits, which I must confess fairly astonished me, and I question whether there are more than two or three men in England who could produce pictures to compete with them. I have noticed, from time to time, in the *Bengal Photographic Journal*, that Mr. Schwarzchild was continually carrying off the medals of the Bengal Society, occasionally two at a time, but I innocently thought that probably any decent picture would be sufficient to run away with any quantity of medals in India. However, I was gratified to find that these prize pictures were some of the best photographs the art has produced.

Another advance is made towards the absolute permanence of silver prints: possibly too late, seeing that silver printing must be superseded by carbon, and possibly not quite so great an advance as its introducer claims for it; but still a move in the right direction is always pleasant to chronicle. I allude, of course, to the use which Dr. Angus Smith proposes to make of peroxide of hydrogen in eliminating the last traces of hypo from silver prints. As this method has already been explained in the News, and the arguments for and against it stated, I need not enter into details, but I would suggest that it should have a thorough trial. The use of the dilute peroxide of hydrogen can do no harm to the prints, and there is every probability that it will render them much more permanent.

Few photographers are aware of the immense benefits which have been conferred on the art by Sir John Herschel. Our "Household Words" are Niepce, Daguerre, Talbot, Archer, &c., but few know that it is to Sir John Herschel we owe the corner-stone of all our proceedings—the method of fixing employed at the present time. Previous to Sir John's discovery that photographs could be fixed in hyposulphite of soda, the early discoverers got no further than the use of common salt or bromide of potassium. There is another interesting fact to state. The mind which has measured and catalogued the stars, written treatises on the "Differential Calculus," and on "Sound," on "Natural Philosophy," and on "Light," also invented—but he did not give them that name—what are now called Magic Photographs.

Now the landscape season has set in in earnest, photographers are fast deserting town for the localities they have selected for their summer campaign. Bedford is gone to Devonshire to complete his charming illustrations of that picturesque county. England is gone or going up the Rhine, and is certain to bring back an interesting collection of negatives. Others have escaped with the greatest secresy, some ashamed of taking a holiday, others perhaps fearing poachers on their hunting grounds. New localities are difficult to find now-a-days.

At the Photographic Society of London Mr. Allan read a paper entitled "A Few Thoughts Concerning the Angle of Vision," through which I have searched in vain in the endeavour to find any reference or application to the objects of the Society before which it was read. Although the author stated that the eye only took in an angle of ten degrees, he says it is truly a panoramic lens! This is not the only statement that has puzzled me. He stated that "the eye gathers up the rays of light reflected from an object, and casts them on the retina, in the form of a small but latent image of the object; but this latent image is nothing worth unless it be developed, or made manifest to the senses. The mind, by observation, brings forth to light this hidden and latent image, and stamps it with immortality." I had always thought that the image refracted by the cornea on to the retina was one of the most fleeting character. If Mr. Allan will reconsider the matter he will find that instead of being "stamped with immortality," the image is retained by the retina, or rather the surface of the choroid, after the object is removed, the tenth part of one second only. This period of time does not, as far as I have heard the word explained, constitute immortality.

The paper read by Mr. Cocking at the meeting of the South London Society, on "The Particular Kind of Art Study to which Photographers should give their Attention," was a thoughtful and well-written exposition of the use and power of the art as it presented itself to the writer. Although I am compelled to differ from the author on several points, I cannot help expressing my conviction that temperate papers on the subject, such as the one read by Mr. Cocking, even if open to question in parts, would do a vast amount of good. My chief objection to Mr. Cocking's paper is, that he attempted to prove that photography was not a fine art. It is not the fault of the art-producing capabilities of photography that nine-tenths of photographers produce wretched rubbish which brings the art into contempt; neither does its capacity for producing bad work in bad hands at all convince me that therefore it will not produce fine art, and I think the discussion which took place must have convinced the writer of this.

At the North London, Mr. Dunmore read a suggestive paper on "Foregrounds," which is worthy of attentive reading. Photographers generally do not fully appreciate how much depends on the foregrounds of their pictures. A little consideration before planting the camera will often afford a good picture of a common-place object.

To the important communication on the employment of peroxide of hydrogen in photography, by Dr. Angus Smith, read at the Photographic Society of Scotland, I have already alluded. The meeting was rendered still more interesting by the exhibition of a large number of pictures of Melrose Abbey, taken by Mr. W. D. Clark and Mr. Smith of Darnick. These gentlemen have been employed for some time in making a complete series of this grand relic of the architecture of the middle ages. Mr. Clark read a paper describing the operations of himself and his fellow-labourer.

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SHELLAC PRINTING PROCESS.

BY ARTHUR TAYLOR.

[We call the especial attention of our readers to the following communication from Mr. Taylor, an able amateur residing at Marseilles.—Ed.]

The Photographic News for March 29th contained an interesting extract, from the *Scientific American*, on the preparation of lac varnishes. I am induced by this circumstance to send you a cursory account of a photographic printing process in which shellac plays an important part, and which I have now used for some years with satisfactory results.

The paper to be printed on, instead of being albumenized, or salted with any of the ordinary solutions, is coated with a preparation compound of bleached shellac, dissolved in an aqueous solution of borax, and, thus prepared, may be rendered sensitive, and used like ordinary albumenized or salted paper.

The impression in the printing frame is of a red colour, and, if simply fixed in hyposulphite of soda, it retains a disagreeable chocolate tinge; this may be avoided by toning in a bath containing gold. In my own practice, however, I prefer toning the proof to a bright bistre colour, by passing it first through a solution of sulpho-cyanide of ammonium, and then fixing finally in hyposulphite of soda. The proof is rendered yellow by the sulpho-cyanide, and darkens again to a bistre colour in the hyposulphite.

Shellac may also be dissolved in an aqueous solution of phosphate of soda (2 Na O, HO, PO_5+24 HO). Paper coated with this preparation, and rendered sensitive in the ordinary way, prints very rapidly; the impression in the frame is either black or of a dark sepia colour, and this tint is not sensibly changed by fixing in hyposulphite of soda.

Papers coated with shellac solution, containing both borate and phosphate of soda, take very agreeable tones; intermediate between the red (due to the borate), and the black (due to the phosphate of silver). These tones may be varied at will, by regulating the relative proportions of the two salts; they may also be obtained in a more or less yellow colour, by the use of sulpho-cyanide of ammonium in the manner before stated.

The preparation with phosphate of soda is most suitable for printing from very intense or hard negatives; whilst those which are very soft or weak may best be printed on paper prepared with borax. If a mixture of the two salts be used, it may be so proportioned as to produce the best results from any class of negatives.

If sheets of paper, prepared as above described, rendered sensitive in the bath of nitrate of silver, and dried, are once more plunged in the shellac solution, their sensitiveness is not impaired, but is, on the contrary, rather increased; the prints obtained are very vigorous, and, moreover, the paper will be found to have acquired most valuable keeping properties, remaining white and sensitive for an apparently indefinite period, if merely protected from the light in an ordinary portfolio.

Modified results may be obtained by floating the sheets, previously coated with shellac preparations, on solutions of various salts, such as, for instance, solution of sal-ammoniac. The few experiments made in this direction gave very promising results.

The shellac coating may be made to give a glazed surface to the paper, but such a surface is by no means a necessity of the process; this last point I consider as an important advantage.

Ordinary smooth paper answers perfectly well for printing on by this process; but I prefer printing my own productions, which are chiefly landscapes, on rough paper, such as is used for water-colour drawings. Whatman's drawing-papers answer exceedingly well.

I will not now attempt to give the various formulæ, or to describe the manipulations to be employed in the application of this "shellac printing process;" for I fear that you may already find this communication somewhat too lengthy, and I wish, before concluding, to notice one more point, namely, the degree of permanency which photographic proofs produced in the manner described may be expected to possess.

I have used this printing process exclusively for the last three years, and, although many of my numerous experimental prints were treated with less than ordinary care, their permanency not being considered of any importance, I have not as yet met with any symptoms of either fading or change of colour in any of them; and the whites, which are especially clear in the fresh prints, remain unaltered in the oldest which I possess.

Shellac is a substance so remarkably free from any tendency to change through atmospheric influences, that the permanency of silver photographs will, no doubt, be enhanced by its substitution for such an unstable compound as albumen.

Moreover, I now frequently saturate the finished proof with a weak solution of shellac in alcohol; this does not, as might be feared, give a varnished appearance to the surface of the paper, but it increases the vigour and improves the general effect of the print, whilst each particle of the image being thus hermetically enveloped by the varnish, this treatment must be greatly conducive to its preservation.

Hoping that you may consider the present communication of sufficient interest for insertion in your estimable journal, I remain, Sir, most sincerely yours,

Marseilles, May 9th, 1866. Arthur Taylor.

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M. CIVIALE'S PHOTOGRAPHIC STUDIES OF THE ALPS.*

Report presented to the Paris Academie des Sciences.

Having now explained the aim the author proposed to himself, and the means he has employed, your Committee have next to make known the *ensemble* of the documents which he has collected during seven consecutive years since 1859. But the mere enumeration would be very long, and besides, they may be found in the seven communications which M. Civiale has made to the Académie under the most reserved and modest form. This *ensemble* comprehends not less than twenty-five panoramas and four hundred views of details.

We must therefore content ourselves by showing to some extent the point at which the author has arrived in the great task he has imposed on himself.

It has been justly remarked that the very limited and relatively little elevated mass of St. Gothard constitutes in the *ensemble* of the Alps of Switzerland, Savoy, and Italy, a central nucleus, from each side of which the several mountainous groups present a nearly symmetrical arrangement. From this central nucleus we see diverge the two streams of water—the Rhone and the Rhine, which, after following in an opposite direction the southern base of the great chain, turn suddenly towards the north, the one through the valley of Martigny, the other through the valley of Coire, to lose themselves in the two lakes of Geneva and Constance.

At the south-west corner, the masses of Mont Blanc and Mont Rosa, connected together by the very elevated chain which begins at Combin and ends at the Matterhorn or Mont Cervin, have their analogies, at the north-east angle, in the three masses of Valrhein, Bernina, and Bernardino, which connect the last two. Some analogy may also be found to exist between the valley that leads to the Rhone, at Visp (Viège), the waters of the mass of Mont Rosa, and the valley of the Hinter Rhein, which falls into the Rhine above Coire. Lastly, the Inn, which has traversed the Bavarian Alps, bears the waters of the Bernina to the Danube, while the analogous Arve is stopped, like the Rhine, by the barrier of the French Jura.

But if the two lateral enlargements of the great chain of the Alps can be brought together, as we have shown, the central nucleus possesses, on the contrary, characteristics which are peculiar to it. Thus, the passage of the St. Gothard is the only one which leads directly from the northern to the southern plains; everywhere else two necks must be passed through. Immediately to the west of this passage extends to the very centre of the chain the largest uninterrupted accumulation of glaciers existing in the Alps, from the Spitzelberg and the Galenstock (glaciers of the Reuss and the Rhone), to the glaciers of the Aar, the Aletsch, and the Lötsch, an immense sea of ice which is dominated by such heights as the Jungfrau, the Shreckhorn, the Mönch, the Eiger, the Finster-Aarhorn, etc., which make of the chain of the Bernese Oberland the most picturesque mountain chain in the world.

This is not the place to show that all these accidents have nothing fortuitous in them, but that they are, in reality, only the geographical expression of the great laws of stratigraphy. It will suffice to remark that they contribute to form three vast alpine regions, two of which, as we have shown, may be each divided into three distinct groups, which finally constitute seven mountainous masses to study from the point of view of orography and physical geography.

M. Civiale has not shrunk from the difficulties of such a task. During his first journey, in 1859, he attacked the centre nucleus of the Alps, the region of the Bernese Oberland, by a long sojourn at Grindelwald; in 1862, he studied on the south, in a panorama taken from the Aggishorn; and he terminated it, in 1863, by a sojourn at St. Gothard, from whence he embraced, on one side, the mass of the Furca, on the other that of the Galenstock; lastly, by a sojourn at Dissentis, from whence he embraced all the eastern portion. The enlargement on the south-west, which comprehends the highest Alpine summits, has also been successfully attacked: the mass of Mont Blanc, in 1860, at Chamouni, for the western face; in 1861, at Courmayeur, for the eastern face; the mass of Mont Rosa, and that of the Simplon, with the high valley of the Rhone, in 1861, by a sojourn at Zermatt, the passage of St. Theodule, the highest neck of this chain; in 1862, by the valley of Sass, the sojourn in the isolated and uninhabited house of the Mattmark; the panorama taken from Mouto Moro, the sojourns at Viosch and at the Aggishorn.

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* Continued from p. 248.

The intermediate chain between the mass of Mont Blanc and that of Mont Rosa, which commences at Combin and ends at Mont Cervin, although it deserves to be as well known as any other portion of the Alps, is one of the least known. At present M. Civiale has obtained only a partial view of it, taken from the northern side, at Pierre-à-voir near Saxon, in the valley of the Rhone; but he proposes to attack it this year on the southern side, by a general view taken from Becca di Nona, an isolated summit above Aosta—and already known by the fine panoramic productions of Canon Carrel—and then to penetrate the interior by the Great St. Bernard.

The enlargement of the north was perfectly studied in 1863 and 1865, for the two valleys of the Rhine, by a sojourn at Thusis, and by the panorama taken from the peak of Muraun, which embraces a circular diameter of not less than 46 miles; for the intermediate chain of the Bernardino, the high valley of the Inu, and the mass of the Bernina, by a sojourn at Hinter Rhein, by a sojourn at Süss, in the lower Engadine, and the ascent of the peak of Mezdi; by the panorama taken from the Languard peak, near Pontrésina (10,880 feet), which embraces in its vast horizon the mountains of the Grisons, St. Gothard, Bernina, and the first summits of the Tyrol; by the valley of Poschiavo, and the panorama taken from point Confinal, above the passage of Conciano, which has given the mountains of Valteline, and the fine mass, almost isolated, of Monte della Disgracia; lastly, by the valley of the Munster, and the panorama of the Miuschuns (9,700 feet), which extends to the Ortler, a point so remarkable for the separation of the waters between Switzerland, Germany, and Italy.

In this beautiful panorama, one of the last the author has obtained, the western summits of the Tyrol occupy nearly two-thirds of the picture. But from the preceding year, M. Civiale had not been able to resist the desire of attaching the Tyrolese Alps to his great work of photographic description, and he devoted the summer of 1864 to this beautiful country, still so little known in some parts. This campaign, certainly one of the most interesting of those we refer to, is divided into three very distinct portions. The first station was at Mieders, in the valley of Stubay; a panorama taken from Saile-Pitz connects the Ober-Rheinthal with the Tyrolean Chain; then, entering into the territory of Salzbourg, our traveller has made, in the high valley of Salzach, the ascent of the Geistein, from whence he embraced all the central chain, the mass of glaciers in which is not less than 81 miles in length, is dominated by the Gross Glockner and the Gross Wenediger.

Finally, retracing his steps, he has penetrated into the Italian Tyrol, amid those deposits of dolomite which have rendered the valley of Fassa so celebrated, and of which his photographs represent the details with admirable truthfulness. From one of the summits of the Schleru he has taken a panorama comprising the whole 360 degrees, and representing, upon a diameter of 118 miles, all the Italian and German Tyrol, a part of Salzbourg, the great central chain of Gloekner, the Ortler on the west; and lastly, on the east and the south, in the foreground, the dolomites of Grödnerthal, Colfoseo, and the Verdeta Marmolata, the highest of these gigantic dolomitic walls.

Such is the *ensemble* of the photographic works which M. Civiale has submitted to the judgment of the *Académie.* We perceive that, by their number, variety, and happy selection of the points of view, by the accuracy with which all the *data* which can serve to the progress of geology and physical geography are established; in a word, by the scientific spirit which has so constantly and surely directed the author, this collection already constitutes a collection which will be consulted by every person desirous of thoroughly studying and understanding the great Alpine Chain.

The utility of those beautiful documents will doubtless be still better appreciated if the author, upon the conclusion of his task, publishes a text which shall contain, not only the *data* of the observations, which impress a peculiar character upon his work, but also a host of interesting remarks which the aspect of places has suggested to him, and which are scattered through his *Journal*, which we have read.

Vividly impressed as the Committee is with these long and persevering efforts, so happily crowned with success, the *Académie*, in thanking M. Civiale for his interesting communications and magnificent photographs which accompany them, desire, at our suggestion, to encourage and bring to a good end the task he has so courageously undertaken, by according to him the testimony of its highest approbation; certain, moreover, that this judgment will be confirmed by all those who appreciate the merit of truth and exactness in what relates to the bases of physical geography.

M. M. Regnault.
Ch. Daubree.
Sainte-Claire Deville.

PHOTOGRAPHIC ENTERPRISE IN AMERICA.

The *New York Mirror* contains a series of interesting papers, entitled "Manhattan Papers," containing a record of the old commercial houses of New York. No. 48 of the series is devoted to a description of the photographic manufacturing establishment of Messrs. E. & H. T. Anthony, which contains many facts which will be interesting to our readers. We shall, therefore, reproduce it for their benefit :—

"There is amusement and instruction combined in a glance at the pictures in a good stereoscope. It entertains both young and old, and the family fireside is more inviting, and many an agreeable hour can be passed in looking at objects of interest in various parts of the world. A correct view of scenery, persons, and places is gained by this wonderful instrument; for it presents in bold relief the various outlines, the perspective and the minute details, as truthfully as if the looker-on were standing on the identical spot of earth where the objects were taken.

"The house of E. & H. T. Anthony & Co., situated at No. 501, Broadway, is largely engaged as dealers in American and foreign stereoscopes, stereoscopic pictures, and photographic materials. Edward Anthony, the head of this enterprising establishment, was favourably known throughout the country as a photographic artist, and dealer in photographic materials, for a period of more than twenty-five years. Some eight years since he entered largely into the business of stereoscopic pictures, making this an important feature of his widely extended business.

"Edward and Henry T. Anthony were both born in New York city, and are the descendants of an old Knickerbocker family. Their earliest ancestor, Allard Anthony, came to to this country from Holland, in the early settlement of New Amsterdam, and held the office of Sheriff of the city about one hundred and fifty years ago. The brothers Anthony were brought up to the profession of civil engineer. In 1841, previous to the settlement of the Ashburton Treaty, the United States Government employed Edward Anthony to take photographic views of the Highlands of Maine, and it is the first instance of photography ever being employed for a like purpose. The English Government had always denied there were any Highlands where Uncle Sam claimed the line. Photography settled the question much better than diplomats could.

"Immediately after taking these views of the disputed boundary line, Edward Anthony came to New York, and started in his present line of business. His commencement was made in Broadway, and the house ever since has transacted business in that great street. W. H. Badeau, the remaining partner, was brought up in the house. The respective members of the firm are all gentlemen of energy, artistic taste, and decided ability in the field which they have selected for their commercial success. To give the reader some idea of the careful manner in which the business of E. & H. T. Anthony & Co. is conducted, it is only necessary to say that the rise and fall in gold, during the war and since, has been so narrowly watched that the establishment in almost every case has bought and sold goods at precisely the favourable moment to save them from losses, and, at the same time, insure them a fair profit. The good judgment exercised on these occasions gave them princely returns during the entire period of 1864 and 1865.

"This is the principal house in the United States excluclusively devoted to photographic materials and stereoscopes, and all the goods kept by them are of the most choice description, both beautiful, instructive, and durable. In fact, it is a place of general resort for dealers and buyers who desire to be promptly served and honestly dealt with, and who wish to secure the latest and rarest productions of the Old and New World, an additional inducement to this end being the well-known fact that this firm, aside from their own facilities at home, employ competent agents in both London and Paris, as well as in all the principal continental cities of Europe, who constantly forward them the latest and best stereoscopic views, photographs, apparatus, and materials for the art. Orders for goods of all kinds are promptly served, and the utmost care is bestowed in their selection, and forwarding them to their destination. The senior partner of the firm has recently returned from Europe, where he has been for many months past. He brings with him everything new, artistic, and interesting in their line found in the markets abroad.

"E. & H. T. Anthony & Co. have a very large assortment of pictures, embracing views in Great Britain, France, Holland, Belgium, Switzerland, Italy, Russia, Turkey, Greece, Germany, the Holy Land, Egypt, China, India, and America, scenes in London, Paris, Versailles, St. Cloud, Fontainebleau, Cherbourg, Rome, Edinburgh, St. Petersburgh, the Rhine, the seats of the English nobility, the Crystal Palace, Sydenham, royal abodes, also historical groups, amusing objects, and statuary. In their catalogue is a fine list of illuminated interiors of churches, cathedrals, castles, and palaces in France, Italy, and England.

"Their collection of pictures of classic interest is very complete, and persons of refined and enlightened taste will be much gratified in looking over the extensive, admirable, and entertaining variety, in which may be recognized the homes of poets, princes, statesmen, philosophers, authors, editors, and noted individuals of every country, clime, and language, among the leading European nations as well as our own.

"For the drawing-room, parlour, or boudoir, the exquisite views above named are very appropriate, and add much to the comfort and pleasure of admirers of art and lovers of nature. Nothing can be more beautiful than a room thus decorated, and one can offer to a friend fond of the picturesque and magnificent, no greater treat than to exhibit to him a choice collection of gems of this description.

"Few people living in the rural districts are aware of the splendour, the vast traffic, and the general interest which attaches to a metropolitan establishment of the kind conducted by E. & H. T. Anthony & Co.

"The size of the store occupied by this celebrated firm is four stories high, thirty feet wide, two hundred feet deep, and it is filled to repletion with the most desirable goods. It is sufficient, to give a correct opinion of its extent, to state that there is no establishment in either London or Paris to compare with it in extent, neither has any such an assortment of beautiful and tasteful albums. The house is orderly, prompt, public-spirited, and energetic; and this, united with taste, large resources, and unequalled facilities for accommodating their patrons, enables them to secure a very large and prosperous business, and their transactions extend to every part of the Continent, and to the principal foreign countries."

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ON THE SPONTANEOUS RE-SENSITIZING OF IODIDE OF SILVER.

BY M. CAREY LEA.*

A number of curious experiments have been made at various times, which have tended to show that after iodide of silver has been exposed to light for a considerable time, its sensibility can be restored by certain agents. For example, it has been shown that iodide of potassium has this effect, and Prof. Himes showed that tannin also had the like power. But always, so far as I am aware, this recovery of sensibility has been produced, or attributed to the action of a sensitizing agent. And I believe it has never been demonstrated, as I here propose to do, that *pure iodide of silver will spontaneously recover its sensitiveness to light without any extraneous agency whatever.*

Some pieces of ground glass were silvered in the manner which I have already described in previous papers, and were then iodized by leaving them for some hours in a bath of iodine dissolved in a solution of iodide of potassium. In accurate experimenting, I always prefer the use of iodide films prepared in this way, because thus alone I am certain of thoroughly eliminating the influence of organic matter; and I may remark in passing, how completely the mere fact that this system is possible contradicts the assertion, so often repeated, and which I have so often controverted, that pure iodide of silver is insensitive to light. This sensitiveness, so long and so persistently denied, is in actual fact so well marked and invariable, that it may be made the basis of a series of experiments, looking to the determination of questions perfectly distinct from it.

A piece of glass, so silvered and iodized, was thoroughly washed, and was then, not merely exposed to light in the ordinary manner, but was laid in a clear, bright sun for several hours. It lay thereafter on a table for many more hours in strong diffuse light. It was then put into a yellow envelope, and was laid in a dark drawer, where it remained for thirty-six hours.

It was then taken to the dark-room (without, of course, exposing it freshly to light), was placed in a printing-frame under a negative, and exposed for a couple of seconds to sunlight. Removing it from the frame, a collo-developer with nitrate of silver was poured over it, and brought out without difficulty a clean, sharp image. There was not the least tendency to fog; in fact, the image was particularly free from any such disposition.

This experiment naturally led to another, in which the conditions were varied. In the foregoing there was no organic film, and no nitrate of silver in the free state present. In the following both of them were; and bromine was present, which was not the case in the first experiment.

An ordinary plate was coated with an ordinary bromo-iodized collodion, and was sensitized in an ordinary negative bath, containing a trace of free nitric acid. It was then, without washing or other preparation, but exactly in the condition in which it came from the nitrate bath, laid in a bright sun, in which, and subsequently in a bright, diffuse light, it remained for some hours till the end of the day. The plate was then washed under a tap, set in a closet over night to dry, and next morning was exposed under a negative to diffuse light for a few seconds. With a developer, an image was obtained without difficulty; not clean and bright, however, as in the preceding case, but fainter, and with some tendency to fog.

I cannot but consider these experiments as remarkable ones, and as being strikingly against that theory which imagines the existence of a chemical decomposition or reduction in the formation of the latent image. The mere attempt to apply the chemical theory to such a case seems to result at once in the production of a series of absurdities.

An exposure of ten seconds in a camera will produce a latent image; that is, according to the views of those who sustain the reduction theory, it will liberate enough metallic silver or subiodide (they are not agreed which) to form the foundation of a developed image. Now, my first plate remained about three hours in direct sunlight (I will even leave out the exposure to diffuse light, which was equivalent to perhaps half as much more sunlight; the case is quite strong enough to spare it), which three hours is eighteen hundred times ten seconds. Then the direct sunlight is perhaps a thousand times as strong as the light in the camera (speaking very roughly, as the light in the camera varies between wide limits), so that the exposure which this plate underwent was, we may say, very roughly, *eighteen*

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* *Philadelphia Photographer.*

hundred thousand times as long as the camera exposure. Nor is there here any possible ground for cavil, for there is no reason to suppose that had the plate been exposed in the sunlight for three days instead of three hours, the result would have been different.

If, then, an exposure of ten seconds is sufficient to produce a reduction of a certain definite quantity of silver, an exposure so very much longer ought to cause the reduction of a quantity larger in proportion, if, indeed, the quantity of iodide present was sufficient to furnish so very large a quantity. And when the developer was applied, such a plate ought to fog instantly all over.

But it does not. Not only does the silver not become wholly reduced, nor the plate merely not fog, but it is actually in a condition, after a brief rest in the dark, to receive a fresh impression. It is not even necessary, as proved by the first case, to wet the plate; it simply recovers its sensitiveness by reposing. Is not this very wonderful? And does it not completely disprove the chemical theory?

It has been a favourite argument with the reductionists, that an exposed plate recovered its sensitiveness by immersion in a solution of iodide of potassium. This, they said, restored the iodine which had been separated by the reducing influence of the light, and the plate thereby returned to its original condition. But here is a plate which recovers its sensitiveness *without* iodine being restored to it. What went with the iodine which the reductionists say is eliminated by the light? It must have been dissipated through the atmosphere. How, then, was it restored to the decomposed film?

These experiments may be taken as a complete *reductio ad absurdum* of the chemical theory, which is thus seen to involve the following insurmountable difficulties:—

1. The iodide of silver on the plate which I used weighed less than a grain. Consequently, if, in the exposure of such a plate in the camera, there was a reduction of any definite quantity of silver, and that quantity reached the one-eighteen-hundred-thousandth part of a grain, then, by the long exposure of any plate in the sun, the whole of the silver ought to have been reduced. This was not the case.

2. But supposing that the quantity of iodide of silver decomposed was even far less than this, still it was, in any case, eighteen hundred thousand times enough to fog the whole plate. Why, then, did not the whole plate fog?

3. As the plate did not fog, it must, according to the views of the reductionists, have been re-iodized. Whence, then, did it recover its iodine? On this point, it would be very interesting to hear a plausible explanation.

4. If iodide of silver is so easily capable of decomposition by light, as asserted by the reductionists, how is it (even putting all the other difficulties for a moment aside—how is it that a portion escapes decomposition by a three-hours' exposure to light, and yet is decomposed by a two-seconds' exposure next day?

These difficulties, altogether insurmountable by the chemical theory, involve no contradiction with that which ascribes these effects to a physical cause. According to this view, as there is no decomposition, so there is no need of constitution. The reproduction of a latent image is ascribed to some mere molecular alteration or polarization of the particles of iodide. As to the exact nature of this change, from the very nature of the case it is necessarily very difficult, if not impossible, to define it. But I have already, in a previous paper, endeavoured to show that a pure physical cause is sufficient to produce analogous results in other cases; that simple pressure on glass will determine the deposition of a precipitate upon those places, and that, in a very similar way, simple pressure upon iodide of silver will cause a deposit of silver on the parts subjected to such treatment, thereby affording a true case of development of a latent image produced independently of light, and independently of all possibility of reduction, or any other species of chemical decomposition.

And finally, I may remark, that the single experiment first herein described, seems to carry in itself the incontrovertible proof of the two points for which I have so long argued: the sensitiveness of pure iodide of silver, and the physical nature of the latent image.

PHOTOGRAPHY ON SILK, SATIN, LINEN, ETC.

BY F. EDELBAUR.

Pure materials are chosen of white colour, for with coloured materials there is danger that their colours are changed in a very undesirable manner. In the case of linen and other stuffs, which usually come to market strongly starched, it is first of all necessary to remove the starch by washing.

A solution of albumen is prepared from one egg, five ounces of distilled water, and twenty grains of chloride of ammonium. The albumen cells are destroyed either by violent agitation, or better by whipping: the mixture is allowed to stand, and then filtered through a clean cloth.

The solution is then poured into a clean dish, and the cloth floated on it on that side on which the picture is to be copied, and left there for about five minutes, then removed and dried by being suspended to a string.

If the picture is only to occupy part of the material—for instance, the corner of a pocket-handkerchief—this part only need be albumenized, and the other operations performed, of course, on this part.

The coagulation of albumen by means of alcohol, if this is at all possible, appears superfluous, for it is produced without this by the sensitizing bath.

This consists of ten parts of distilled water to one part of nitrate of silver. The materials, after they are quite dry, are floated on this bath for six or seven minutes, of course with the albumen side downwards, and are then dried in the manner previously described. Great care is here required that the silver only touches those parts that are impregnated with albumen, and also that no drops or spots are formed on the back, so as to keep the stuff clean.

The silvering and copying must be proceeded with on the same day, otherwise the materials acquire a strong yellowish colour.

The copying proceeds very quickly, and, as with ordinary paper, the printing is somewhat over-copied. If the cloth is much larger than the picture, the prepared part is stretched smoothly over the matrix, a layer of paper or the copying cloth laid upon it, the excess of cloth packed away, a layer of paper laid upon it, and the frame closed. The space about the matrix must be protected against the action of light.

The colouring and toning are performed in the usual manner. The colouring bath which I use consists of eight ounces of distilled water, ten grains of bicarbonate of potash, and one grain of chloride of gold; the fixing bath consists of half an ounce of hyposulphite to four ounces of water.

With regard to washing before and after colouring and after fixing, the same rules are observed as in copying on paper. After washing out the soda, in which operation the cloth is totally immersed, the linen may be soaped, rubbed between the hands, and again rinsed in clear water, after which it is dried and polished by means of a roller and smoothing-iron. Silks must be placed under a semi-moist cloth before being smoothed by the smoothing-iron, in order to give them polish.—*Photographische Correspondenz.*

LIGHTING THE SITTER.

In the course of some remarks upon this subject, Schnauss observes that one of the commonest faults lies in having a too powerful front illumination, throwing the high lights on the ridge of the nose, the centre of the forehead, the chin, and the elevations of the cheeks. In such a case the eyes have a bright point precisely where the black pupil ought to be, if they are directed forwards, and this especially with light eyes. As sources of hard negatives he specifies :—

1. Under-exposure and over-development.
2. Old baths, especially those acidified with acetic acid.
3. Old reddish collodion with little or no bromide.
4. Use of iodide of ammonium or potassium.
5. Pyrogallic development.
6. Too cold temperature in winter.

Soft negatives depend upon the free use of cadmium, a full proportion of bromide, and avoidance of redevelopment.—*Philadelphia Photographer.*

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Proceedings of Societies.

Marseilles Photographic Society.

A meeting of this Society was held on the evening of the 2nd ult., M. Teisseire in the chair.

After the usual routine proceedings,

M. Vidal, in the course of some remarks on recent progress, mentioned the process of Mr. Woodbury as especially worthy of attention, as producing more perfect gradation of half-tone, without the aid of the burin or the production of grain, than any similar process. He then referred to the attention which had recently been called to the gelatino-iron developer, but for the present refrained from expressing any opinion on the subject.

M. Meynier regarded the introduction of gelatine, gum, and sugar into the iron bath as simply aiding iron solution to penetrate more easily the film, and then to facilitate development. He thought their Society should appoint a committee to study the subject, and to make a personal communication.

The President recommended the nomination of this committee.

Amongst interesting facts worthy of attention, M. Vidal called the attention of the Society to the aniline process of Mr. Willis, the intensifying process of M. Ommeganck, and concluded by some remarks on Mr. Wharton Simpson's recent experiments in heliochromy, in which he employed collodio-chloride of silver.

M. Meynier exhibited a panoramic printing-frame invented by M. Carbonel. This pressure-frame is furnished at each end with a box to hold the roll of paper to receive the panoramic view with a portion between on which to rest the successive negatives. M. Maiffredy, partner of M. Carbonel, exhibited a magnificent panorama of the City of Marseilles printed in this frame, and promised a copy to the Society.

M. Meynier exhibited an organic iron compound, of which he was the inventor. This dissolved in water in less quantity than the double salt of iron and ammonia without alcohol, and developed slowly until intensity is complete. It was the ordinary double salt, combined with glucose.

The thanks of the meeting were accorded to M. Meynior, and a committee appointed to examine organic iron developers.

M. Meynier also placed on the table a bottle of an ammoniacal nitrate of silver. The object of the salt was to realize the advantages which accrued from the introduction of ammonia in the preparation of paper—acceleration of sensibility; also, absence of inconvenience arising from the direct use of ammonia, and loss of the whiteness of the sensitised paper. This salt was a combination, and not a mixture. The difficulty of determining quantities was avoided by its use, also the inconvenience of respiring disagreeable emanations.

M. Taylor exhibited a portable camera of his invention, for working in the field with waxed paper. He gave the details as follows :—With reference to the focal distance of the lens, it is seldom, he said, that an image can be seen from its most favourable point of view, if it be not at least ten inches from the eye. It is necessary, therefore, in order that an image should give a correct idea of an object, that it should be taken at a focal distance of about ten inches. With reference to the angle embraced by the objective, many were in favour of lenses embracing an angle of 30 deg., but the perspective then suffered. The pictures of painters generally subtended an angle of about 50 or 60 deg. He contented himself with a maximum angle of 50 deg. In practice, painters had adopted, as a general rule, not putting the point of view in the middle of the picture. Why not follow in photography that law, consecrated by the most sacred traditions of art, and imitate the great masters, by placing the point of sight out of the centre in a photographic landscape? The author accomplished this end by displacing his objective from left to right or from right to left, thus choosing exactly the point of view desired. By an analogous movement he could also elevate or depress his lens, as occasion required. The dimensions of the picture were 14 by 10.

After some other presentations,

The President reminded all who presented pictures, of the importance of attaching a date, that afterwards comparisons might be made as to the stabilities of the various processes employed.

The meeting then terminated.

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Correspondence.

CARBON PRINTING.

[from our special correspondent.]

Paris, 30th May, 1866.

M. Despaquis, the purchaser of the patent taken in 1855 by M. Poitevin, is about to publish a kind of manual of carbon photography. I flatter myself that the readers of the Photographic News will be well pleased to receive a few early extracts from his work, which is now in the press.

Since its origin, carbon photography has undergone numerous modifications. English experimentalists have carried it to a high degree of perfection; my countrymen, on their side, have not been idle. I will now give a concise explanation of the method adopted by M. Despaquis and his pupils.

The process is as follows :—

Into a porcelain capsule put 10 grammes of gelatine cut into small pieces, pour on them 90 grammes of distilled water; after some time, when the gelatine is well swelled, put the whole on a slow fire till the solution is complete. This result is obtained with greatest ease and certainty by the use of a water-bath; that is, by placing the capsule in or on a vase containing boiling water. The gelatine is thus never changed in colour, and does not adhere to the bottom of the capsule. Next add—

Bichromate of ammonia ...	... 125 grammes
Liquid Indian ink ...	... 18 ,,

Notwithstanding its higher price, M. Despaquis prefers the bichromate of ammonia to that of potash. He thinks that it gives greater sensibility to the mixture, that the reaction is more complete, and that time does not cause it to lose its impressionability. The Indian ink is that sold by the trade in a liquid state, therefore the quantity we mention cannot be regarded as absolute, and must be modified according to the intensity of the solution (if the operator prepares his own) and according to the tint desired; observing, however, that too small a quantity leaves the blacks too transparent, while too much prevents the lights from appearing so easily, and the mixture also becomes friable and difficult to use.

It must not be forgotten that the Indian ink may be replaced by any other colour, liquid or solid. The liquid form, which admits of more perfect mixing, and, consequently, gives proofs in which the half-tints are more gradually shaded off, is, however, preferable.

It must be clearly understood, also, that as soon as the bichromate has been added to the gelatine, the operator must avoid the light, and work in a room but faintly lighted with yellow glass, as when sensitizing on collodionized glass.

When the solution is complete, and the mixture perfect, which is easily obtained by means of a glass agitator, filter the whole through a plug of cotton placed in the tube of a funnel. This done, take a cleaned glass (the cleaning need not be so perfect as for collodion) and cover it with the mixture exactly as in using collodion. The surplus liquid is put back into the funnel, then the glass is placed horizontally on a very level surface to dry, which requires, in dry, warm weather, from three to four hours. During the drying, the air of the room should be renewed as much as possible, but always carefully excluding the light.

If short of room, a box may be used like that employed for drying albumenized glasses, at the bottom of which should be placed a vase containing dried chloride of calcium or of sulphuric acid. By this means the ordinary time for drying may be shortened. The manipulator must carefully avoid all artificial heat, which would cause the reaction of the salt of chrome on the gelatine, and render it totally insoluble. The glass, when once dried, may be employed immediately, and for this, place a negative in a press for positives, exactly as if about to take a proof on paper, only, instead of the paper, prepared glass is substituted, placed with the coat of gelatine in contact with the negative. The exposure varies from ten to forty minutes in the broad light, according to the intensity of the light and of the negative. In any case, it is better to leave it too long than too short a time, because, in the former case, it is possible, by removing the warm-water bath, of which we shall soon speak, and by raising the temperature, to sufficiently reduce the tint, whereas there are no means of deepening it.

The proof, when taken out of the frame, is scarcely visible; it must be brought out. For this, the coat of gelatine must be covered thickly with non-iodized collodion. The formula which gives the best results is—

Ether at 62°	... 100	grammes
Alcohol at 40°... ...	... 100	"
Gun-cotton	... 5	"

Care must be taken that the ether be not in excess, because, in that case, the collodion is too retractile, and produces ineffaceable wrinkles. None but collodion perfectly settled must be employed.

When the coat, thus applied, is dry, which does not require more than ten or twelve minutes, the collodion must be detached all round the glass by means of a penknife, then put into a porcelain bowl and covered with warm water. After a moment, raise one of the corners of the collodion, and it will at once come off the glass. Should it stick, no violence must be used, but it must be returned to the bath, and the temperature of the latter be raised, if necessary. As soon as the adhesion has been overcome, take away the glass, and leave the pellicle of collodion, to which the image adheres, floating in the water.

By degrees the bichromated gelatine, which has not undergone the action of light, will dissolve, leaving that which has to form the blacks and demi-tints of the image, which will be seen to detach itself, on the white ground of the bowl. When the whites are very transparent, the warm water is poured off and replaced by cold. From this moment the image may be exposed to the light without any precautions. When the proof has been well rinsed—that is, when it ceases to discolour the water—slip under it, while floating, a sheet of gelatinized, albumenized, or gummed paper, and take out the collodion, which will adhere to it.

When stuck on the paper, the proof is put to dry in the shade, after slightly pressing the collodion with the finger, to drive out any air-bubbles between it and the paper, and to remove any wrinkles which may have been formed. If the wrinkles cannot be made to disappear either with the finger or the brush, lay the whole on a clean glass with the image downwards, and repeat the pressure on the back of the paper; but the image must not be suffered to dry in contact with the glass, since it might adhere in such a manner as to completely compromise the success of the operation. When dry, nothing remains but to cut it and stick it on Bristol board, exactly as the proofs taken with the salts of silver.

If the operator happens to be obliged to make use of an imperfect negative, with which it is difficult to obtain harmonious proofs, on account of the absence of demi-tints, the glass must be exposed, on leaving the press, to diffused light for a few instants. The slight impression which will result cause a little of the coloured mixture to adhere to the whites. The defect of harmony in the negative is thus corrected.

M. Despaquis' work, written with extreme lucidity, will give useful information on the production of photographic enamels, carbon, photography on canvas, and on all the processes connected with M. Poitevin's discovery.

E. Lacan.

[It may interest our readers to know that a manual of Swan's carbon process has been sometime in course of preparation.—Ed.]

ON KEEPING SPECIMENS.—A HINT FOR "MARCUS."

Sir,—The offence complained of is of common occurrence, but at the same time I beg to say that I have rarely ever heard of its being done by any photographer of respectability, or one with the taste and feelings of an artist; but for the main part by photographic "*Welchers*," persons with about as much capability and capacity for art as an elephant has for dancing. I once met with a specimen of the kind, and beg to inform "Marcus," and all who may have the same cause of complaint, the way I administered "a *perfect cure*." After fruitless attempts to get back my specimens, I went down to the small town where the "Arab" dwelt, demanded the specimens, and got them; then took a place that was vacant on the other side of the street, and which, fortunately, had a good, light, enclosed back yard, and opened an opposition establisment. The consequence was, I took away much of his trade, and did a good business for a couple of months, when other engagements compelled me to leave. I, however, got a pupil or two in the town during the time I was there, so that I left the "Arab" something to remember, and, I think, practically convinced him that, on his part, "*honesty would have been the best policy*."—Yours,

A Practical Man.

Sir,—I think the reason why so many of the specimens of operators seeking for employment are kept, is because they omit to send stamps for the return postage.

I had occasion some time ago to require specimens of work, and was inundated with them, while only two of the applicants sent stamps; the consequence was, that if I returned them I incurred an outlay I little cared for.

I think that if a postage stamp was always sent with the specimens, and a word, such as "specimen," or the name of the operator, was written across them in red ink, it would not prevent others judging of their merits, and would prevent them from being used for any other purpose.

A. B. C.

[The suggestion of our correspondent, as to writing name, &c., on the specimen, is well worthy of attention. A stamped and addressed envelope for their return should also be enclosed.—Ed.]

MODIFIED TANNIN PROCESS.

Sir,—As the season and your pages are just now favourable to the discussion of dry plate landscape photography, I take the opportunity of adding my own experience of some years in this department, by offering to the notice of many more practised and successful artists in this method, one which has proved so simple, certain, and satisfactory in my own hands, that I am unwilling to lose the opportunity of recommending it to others. It appears to be quite as sensitive in the camera as any other dry film which is entirely deprived of all *free* nitrate of silver, and therefore its keeping qualities are ensured for any length of time, when light, air, and moisture are excluded; or even without the two latter of these requisites for all good and certain keeping, for an unlimited time, as my plates lose none of their good qualities after many weeks, even in damp weather, and in the camera dark slides only. I use only good hard or pump water, free from iron and organic impurities, for all washing purposes, as well as for wetting the films for development afterwards. Any good bromo-iodized negative collodion is sufficient, but before applying it the edges of the glasses are touched with a solution of india rubber in benzole, with a camel's hair pencil, which effectually secures the film from all risk of disturbance afterwards. The nitrate of silver bath is slightly acid with nitric acid, as is also the washing bath of common water, into which the plates are removed from the nitrate of silver bath. The acid washing bath serves for any number of plates, without change, for one batch of them. After all greasy appearance is removed from the film, attach the pneumatic holder, and rinse off from a jug of common water, then pour on and off for five or six times, a drachm or two, according to the size of the plate, of the following solution, which also serves for many more plates, and rinse off again from the water jug; for as all *free* nitrate of silver is got rid of by this solution, much less washing is required than is usually employed for dry plates.

Tannin	1 drachm
Table salt	1 ,,
Water	3 ounces.

This solution keeps perfectly clear and bright for any time. Put up to dry in the plate-rack, with a piece of blotting-paper at the lower corner.

The developing solutions are, 20 grains of pyrogallic acid dissolved in 1 ounce of spirits of wine; and 20 grains of nitrate of silver dissolved in 1 ounce of Beaufoy's acetic acid.

The use of these requires no description to your practised readers, who will find the result unsurpassed by any other dry process yet practised. Fix with cyanide, and not with hypo, which latter had better be avoided if it can be. Sensitiveness in the camera appears to be almost hopeless as compared with a *wet* film, and a few minutes more or less of exposure are alike fatal to clouds and moving objects. Any increased sensitiveness is at the expense of good keeping qualities, as it is only obtained by the free nitrate of silver not being *entirely* removed from the film. Neither the alkaline nor the hot water development appears to benefit this method beyond that of *saving time*, which seldom exceeds four or five minutes. Intensity of the negative is never deficient under favourable circumstances, and when otherwise wanting, more pyro and silver are alone sufficient, without destroying softness and harmony of tone. From 3 to 30 minutes of exposure in the camera are the utmost limits of my experience, from the best to the worst light and subject, including dark foliage in deep shadow. A mean of about five minutes is most frequently adopted.

Over-exposure is of less importance than the reverse, as the sky only is rendered less opaque in the former case. If any of your expert readers can make bad or inferior negative pictures by this method, it will be desirable to know how they manage to do so. E. T.

Staines, May 18, 1866.

POISONING BY CYANIDE.

Sir,—In the Photographic News of the 18th inst., I find a letter signed "G. L. Thomas," upon poisoning by cyanide, and I fully agree with him that nothing can be of more importance to photographers than a knowledge of the effect of the articles they use upon their system; and I think much valuable time is wasted by many scientific men, in experiments of trifling importance, that might be employed to more advantage in discovering the action of the various chemicals used in photography upon the system of those who use them, and in finding out some remedy for this very serious evil. That cyanide affects the nervous system I think is generally admitted; but what am I to say of myself? I have exactly the same feelings in my legs, arms, and hands as Mr. Thomas, and about two years ago I entirely lost the use of the left side of my face, and was confined to the house for about two months. My face has partially recovered under very skilful medical treatment and the almost daily use of electricity for three or four months, but I have still very extraordinary nervous pains in my limbs, especially in my left arm, and have the headache almost constantly; but, Sir, I have never used one grain of cyanide in my life, always hyposulphate of soda, so the cause cannot come from that quarter. What, then, is the cause? I am not prepared to say it is the effect of other chemicals upon the system, but as my case is like that of many other persons engaged in photography, I think it would be a great boon to the photographic world if some gentleman would give the matter his serious attention; for if the illness we suffer arises from the effect of the chemicals upon our system, a discovery of the same would be of immense importance to us, and would, I have no doubt, lead to a remedy which would be hailed with the greatest delight by every photographer.—Yours very respectfully, Henry Williams.

Watford, Herts, May 29th, 1866.

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Photographic Notes and Queries.

Powder for Adding to the Developer.

Sir,—Having read in a recent number of the News a favourable report of the developing powder sold at 28, David Place, Jersey, I enclosed twenty-four stamps to the secretary, and in due time received an envelope containing—not a powder, but a sticky saccharine composition. This I added to the ordinary iron developer, and on pouring the solution over an exposed plate, to my great surprise no image whatever appeared; and the same thing happened twice in succession. I then tried to produce an image by using plain developers on the same plate, but without success. I congratulated myself on not having purchased a pound of the powder, which costs one guinea.—I am, yours faithfully, Experte Crede.

Cadlington, Horndean, May 26th.

[We reported faithfully on the powder sent to us for trial, and have not since made any further examination. The "sticky saccharine composition" described is altogether different from the white, dry, crystalline powder we received. Having given our own experience to our readers, it is only fair to give that of our correspondent. Probably Mr. De Latour can explain the cause of the failure.—Ed.]

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Talk in the Studio.

The Carbon Process.—We have pleasure in announcing that a practical manual of Swan's Carbon Process is in course of preparation. We shall give our readers due notice of its appearance.

The Exhibition Soiree.—Those of our readers who have anything new or beautiful in connection with photography should remember that, although there will be no Photographic Exhibition this year, there will be an Exhibition Soirée, held next Thursday, in the large hall, King's College, in connection with the Photographic Society. Intending exhibitors should communicate with the Secretary, Dr. Diamond, Twickenham House, Twickenham, without loss of time.

Elimination of Hyposulphite from Prints.—Mr. F. W. Hart has called our attention to a communication he made to the South London Society in February, 1864, on the subject of eliminating the final traces of hyposulphite from photographic prints. He then used a solution of chloride of barium in chlorine water, which decomposed the hyposulphite, and threw down a precipitate of sulphate of baryta. Since then Mr. Hart has made further experiments, and simplified and improved the mode of operation. He now uses hypochlorite of soda, and also employs a very simple test for determining when the last trace of hypo is removed. In the course of his experiments, made two years ago, Mr. Hart employed, he informs us, peroxide of hydrogen, but abandoned it on account of its costliness. At the next meeting of the South London Society Mr. Hart will communicate details, and practically illustrate his mode of working.

North London Society.—We have pleasure in announcing a very valuable paper by Mr. Spiller, for the next meeting of the North London Photographic Association, to be held on the evening of Wednesday, June 6th. The subject is "Photography in its Chemical Aspects," and will include some chemical criticisms of processes and results which cannot fail, in such hands, to be interesting and important.

Caution in Using Matches in Studios.—A fire, fortunately of a trifling character, occurred a few days ago in the carbon printing establishment of Messrs. Mawson and Swan, through some want of caution in the use of lucifers. The droppings from some india-rubber cement on the floor were ignited by a boy treading on a lucifer match which had been dropped carelessly on the floor. The flame, which at first rapidly spread, was soon subdued without much damage ensuing. Photographers having in their establishments inflammable and readily vaporized materials, like ether, collodion, benzole, &c., should be extremely careful to avoid risk with lucifer matches. If the patent matches, which can only be ignited on the box, were employed, there would be no danger from the accidental dropping of one on the floor.

Vignetting.—A correspondent says:—"Perhaps it might be interesting to some of your readers to know a plan of vignetting that I have been using for two years. Cut a piece out of a sheet of strong brown or yellow paper, which is then pasted on the outside of the printing frame (the piece cut out to be exactly the shape you require); then paste on a piece of fine silk paper. You can thus vignette any shape you require."

Starch Paste.—This paste is often used by photographers for mounting their prints; but it is very apt to turn sour and mouldy after keeping for a short time. If a little alcohol be mixed with the starch immediately after it has been dissolved, fermentation will be prevented, and the starch will keep good for a long time.—*Scientific American.*

Brilliant Marbled Papers.—A contemporary says:—"In the factories where albumenized photographic paper is made, a considerable quantity of paper is spoiled in the process, and it is then of but very little use. In Paris and Berlin this paper has always been washed as free as possible from the albumen, and then worked up into envelopes. Dr. Jacobson has found a new use for this paper; he proposes to stain it with aniline colours, and to employ it for labels, covers of boxes, and general decorative purposes. By being splashed with concentrated alcoholic solutions of the various aniline colours, the waste of these coloured papers is now converted into marble paper, of a much more beautiful appearance than what is produced by the old process, from the green-gold lustre which the films of these substances possess. The papers obtained by this method retain the gloss, the bright 'satin' surface of the albumenized material, and are almost as brilliant by transmitted as by reflected light. They are said to be well adapted for shades, transparencies, paper lamps, and other means of decorative illumination."

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To Correspondents.

J. S. E.—It is not of vital importance what colour the interior of the studio is painted. Any quiet neutral colour will answer. It is desirable that it be flatted, to avoid producing a reflecting surface. If you require any portion of the wall to act as a reflector, or if you wish to use a screen as a reflector, pure white is the best pigment you can employ.

A. B. T.—The pinhole question is one involving many difficulties. The excess of iodide is the most common, but by no means the only cause. We demonstrated, some years ago, that the presence of oxalate of silver was an occasional cause, and Dr. Vogel has recently shown that the presence of sulphate of silver was a not unfrequent cause. After definitely satisfying yourself, by trying the usual remedies, that the difficulty is not the iodide, try the tests recently described by Dr. Vogel for sulphate of silver, as the mode in which much nitrate of silver is at present prepared may leave a trace of the sulphate present, and we have not any more confidence in the sample of nitrate of silver you mention than in the ordinary commercial samples.

Numericus.—It is impossible to state the amount of liver of sulphur necessary to be added to any given quantity of old hypo, inasmuch as the amount of the sulphur salt must be determined by the proportion of silver present, and that is of course unknown. You may form an estimate by taking a small portion, say an ounce of the solution, and adding a drop at a time of a saturated solution of the sulphide as long as any black precipitate is formed. Then let it stand until all the precipitate has subsided, and again test the clear liquid above it. If adding another drop of the sulphide solution to one-half of it produce no further deposit, then take the other half and add a drop of a solution of nitrate of silver. If this cause a deposit, it shows that the sulphide has been added slightly in excess. 2. It is probable that your acetate of soda has been slightly alkaline, and that your gold bath is thereby rendered nearly inert. Try the addition of a little more of the chloride of gold solution, or a drop of very dilute hydrochloric acid. 3. In our hands, Ramsden's developing powder, made and used according to formula, was as active as, and required the plates to have no more exposure than, the ordinary iron developer. 4. We do not know where you can procure the stereoscope in question; but Mr. Atkinson, of Liverpool, is the most likely person to whom to apply. 5. We made some experiments, a couple of years ago, with peroxide of hydrogen, with a view to restore a faded print, but without encouraging results.

2nd Vol.—The markings in the unmounted print enclosed are caused by the formation of air-bubbles whilst sensitizing the paper. These air-bubbles have disappeared before removing the paper from the solution, but their first formation causes the spots in question. The pictures are not bad, but a little too brown in tone. They are scarcely so well defined throughout as might be desired: the focus appears to be behind the face, the end of the nose, in each case, being definitely out of focus. If, with the gelatino-iron developer, you fail to get sufficient intensity, it is probably due to the use of a large amount of developer, and dashing it quickly on the plate in such a manner as to drive over the edges, and waste a large portion of the free nitrate. An important point in developing is to use no more than is absolutely required, and to pour it gently on the plate, so as to avoid driving off any of the nitrate of silver solution.

C. L.—It is impossible to produce a stereoscopic effect from two pictures which are printed from the same negative. But if you use a bi-lens camera for producing your card pictures, then they practically become the two halves of a stereoscopic slide, and, if properly mounted, will answer for the stereoscope. 2. Your lighting appears pretty good. The tone of the print is a little too brown, and a plain background would have been much better than the unnatural and inartistic one employed. 3. To register a photograph it is necessary to fill up a form describing it properly, and then take it to Stationer's Hall and pay one shilling. You will find full particulars in our Year-Book for last year. Or you may send a full description and copy of the picture to our Publisher, with fifteen stamps, and he will get it registered.

G. J. W.—No permission is required to enable you to photograph landscapes in the counties you mention. In regard to "places of interest," it will, we presume, be necessary to get the permission of the respective persons having authority over such places.

J. E. Hooker.—The paper is doubtless at fault. The trouble is chiefly manifest, however, when the paper is used in a horny, repellent condition. To avoid it, some have recommended to keep the paper in a damp place for a day or two before sensitizing, by which it would be rendered less horny and repellent. If, when you observe these drops forming on a sheet which is nearly dry, you blot them off with a piece of clean bibulous paper, it will effect an improvement.

R. P. L.—It is probable that you used a collodion, giving a thin image at the outset, of a quality somewhat difficult to intensify. By applying the iodine solution again, after using the cyanide and washing, you will probably find the pyro and silver more readily intensify; or you may, after using the cyanide and washing, apply a weak solution of bichloride of mercury until a general grey tint is produced, then wash; next apply a one-grain solution of iodide of potassium until a greenish grey tint is produced, then wash; then apply the pyro and silver, and you will readily obtain any amount of intensity.

H. R. W.—The markings on the print enclosed are caused by the print having come into contact with something containing traces of hypo before it was fixed, or into contact with nitrate of silver just after it was fixed. The stain would result in either case in which nitrate of silver came into contact with a slight trace of hypo, sufficient to decompose, but not to dissolve it.

G. Wharncliffe.—There is nothing in your operations, as you have described them, to have caused the effect. Some other agent must have been accidentally added. Your best plan will be to boil down the bath to dryness, and then redissolve; or, possibly, to throw it amongst the residues, and make a new bath.

A Constant Reader.—We do not find any print enclosed in your letter. A strong solution of bichloride of mercury is desirable. The addition of chloride of ammonium will enable you to make a much stronger solution of bichloride of mercury than you can make with water alone. We can only refer you to our advertising columns. On the subject of lenses and manufacturers we cannot undertake the invidious task of advising in this column.

H. H. C.—There is nothing to prevent you taking the microscoped photographs to which you refer. We believe Mr. How, of Foster Lane, will supply you with apparatus. 2. You cannot well repair any defect in the cementing of a lens yourself; it will be wiser to entrust the work to an optician. The material used is Canada balsam, and the mode of working is described in our last volume, page 589.

J. V. M.—We cordially agree with much in your letter, but think it undesirable to open discussion on the relative merits of painting and photography, which may lead to angry controversy. The scolding critics to whom you refer are generally glad of an occasion to declaim and denounce, and waste space which may be more profitably employed. It is better not to give them the occasion.

S. S. C.—The new triple portrait lens will just answer the purpose you anticipate. We shall say something on the subject shortly.

J. W.—We believe that the magic photographs may be prepared and sold without any risk, as it will be impossible to maintain a patent in a thing published many years ago.

J. Turnley.—In the process practised by Mr. Gordon it is not desirable to use the albumen preparation twice.

Reflecting Screens.—White glazed calico will answer for a reflecting screen.

Several Correspondents in our next.

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Photographs Registered.

Mr. Jackolett, Waterloo, Northampton,
Two Portraits of Rev. Canon Scott.
One Portrait of Bishop Amhurst.
One Portrait of Rev. Wm. Hammond.
Mr. J. Robertson, Glasgow,
Four Portraits of Rev. D. McEwan

THE PHOTOGRAPHIC NEWS.

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FADING OF OPAL PICTURES.

Mr. Wenderoth, at a recent meeting of the Philadelphia Photographic Society, read a paper on the fading of pictures on opal glass, with which, it would appear, he had been troubled. He speaks of three classes of opal pictures—those taken on wet collodion and developed, in the usual manner of obtaining transparencies; those taken on a surface of albumen, and printed like albumenized paper prints; and those taken on collodio-chloride of silver. Of the first, or developed prints, he has not known any fade. Of the second, or albumen prints, his experience has been less favourable, as some of them have changed. He speaks as follows:—

"The second style is a picture of which albumen and chloride of silver is the base. To my knowledge, this process has not been successful in other hands than my own; and after more than two years' practice and careful study, I hold myself competent to give an opinion as to its properties. When I first commenced to work this process, I reasoned, that as there was only a thin albumen film resting on an unabsorbing material, and not on a spongy absorbing paper, as much washing as would free a negative from the hyposulphite of soda would accomplish the same on an albumen film on glass; but I think now that this conclusion was erroneous, as albumen immersed in water will swell and absorb it to a much greater extent than collodion, consequently requiring a greater amount of washing. In consequence of this misconception, some of my earlier pictures have become paler, but, what is remarkable, have not faded, or what we call so in paper prints; they have become paler, uniformly, all over, without an abrupt disappearance of middle tints, and without showing yellow tints in those places where the black tints have disappeared. My pictures are produced upon the same principles as ordinary prints on albumen paper, and, after fixing, are subjected to a two hours' washing in running water; and unless there be something in the albumen itself that will destroy the picture, these pictures must be permanent, at least as permanent as silver prints can be made; and I am prepared to guarantee them to be as permanent as paper prints."

There *is*, unfortunately, "something in the albumen itself that will destroy," not the picture, truly, but the purity and beauty of the whites, which constitute the glory of the opal picture. We have seen some of Mr. Wenderoth's pictures on albumen; nothing could be more beautiful than they were, and we could not help regretting at the time that the insoluble compound between silver and albumen still remaining in the white, where no silver should be, must inevitably, eventually, be a source of injury to such charming pictures.

Mr. Wenderoth then proceeds to the collodio-chloride, upon which his comments are singularly and amusingly inconclusive. He describes his manipulations, from which it appears that he voluntarily introduces an element of decay which has no real business in the process, and then discovers that the pictures are not permanent. He says:—

"The third style of opalotypes are on collodio-chloride of silver films, a process made public by Mr. G. Wharton Simpson, at a meeting of the North London Photographic Association, May 3rd, 1865,* and practised in this country since June or July last. It is of this style particularly that the cry of fading has been raised, and by those who have been practising it. When first published, I gave it a fair trial, and obtained some fair pictures, but soon found that its results could not be depended upon with certainty; besides, the best pictures I obtained by it could not equal those made by the albumen process. A great drawback to this process is its propensity to blister, which will occur, no matter how much Canada balsam or castor oil is added, and sometimes after the plates had received a previous coating of thin albumen. This previous coating of albumen, in my opinion, is the seat of the evil; but it is not only necessary to keep the collodion on the plate, but it has great influence on the tone of the picture. Collodion which, without a previous coating of albumen, will give a gray, flat, weak picture, will give a strong, good picture on an albumen substratum; and I have found that the thicker this albumen film is, the better would be the tone of the picture. This shows that the silver in the collodion enters into combination with the albumen, which is farther proved by the picture showing distinct marks how and where the collodion was poured on. Now, in the process of fixing the picture, the hyposulphite of soda, being of great penetrating power, passes through the collodion into the albumen underneath, which is proved by the fact, that by an immersion of a few minutes the plates are completely fixed; were it otherwise, they would, after exposure to the daylight, turn dark. But as collodion films resist water very strongly, it is a question if washing with water will remove the soda from the albumen film from underneath the collodion, and how much washing is necessary to accomplish it, or if there is anything in the collodion that will produce fading.

The general opinion in regard to this matter has been, that the same amount of washing negatives are subjected to would be sufficient for this style of picture, the fallacy of which is proven by the one laid before you, which was made in September last, and which shows unmistakable signs of fading, notwithstanding it received one hour's washing in running water. Another picture laid before you, and made at the same time, shows no signs of fading, but I do not remember how much washing it received. Therefore, those who make this style of pictures should set to work and investigate the matter thoroughly, or they will bring injury on themselves and discredit to photography in general."

Of course, as this process is a bantling of our own, we are bound—although, having introduced it fairly into the world, and given it to photographers, we have no further responsibility in the matter—to see that it is not the victim of misconception or misrepresentation. We have printed opal pictures more or less frequently, at intervals, for a year and a half, and we have seen the pictures of hundreds of others, but we have not seen, nor had we heard of one faded until we saw this general statement by Mr. Wenderoth. We have before us some of the earliest we produced, none of which received excessive care, not being washed more than a minute or two in any instance, and they are as fresh and pure as they were when first produced, upwards of twelve months ago.*

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* We had published the process in the News at an earlier period.—Ed.

How is it, then, that they have been less stable in Mr. Wenderoth's hands? He gives, unconsciously, the explanation in his statement of the case. His plates have received a preliminary coating of albumen, which is, he suspects, "the seat of the evil." In this he is doubtless correct, but not simply because the hyposulphite of soda is not readily removed, but because, as we have before said, silver forms an insoluble compound with albumen, which remains after the most perfect fixing and washing. It is true that the amount of fading produced by the albumen and silver need not always be serious, unless the print have been submitted to a strong light; but it undoubtedly may and often will cause serious degradation of the purity of the whites.

The singular part of the matter is, that Mr. Wenderoth seems to regard the use of the albumen, not as an innovation, but as a necessity, and part of the process. Now we have never felt any such necessity for a preliminary coating. In our earliest experiments we found that the collodio-chloride of silver, pure and simple, without any organic addition, which worked well on paper, gave a grey weak image on glass. In one or two instances we tried the effect of an albumen preliminary coating, which gave great vigour and richness, but detracted materially from delicacy, as well as increased troubles. The addition of citric acid was then tried by Mr. Swan with great success, and we have not found, in any instance, difficulty in obtaining the fullest amount of vigour without any preliminary coating whatever. We add neither Canada balsam nor castor oil to make the film adhere. With a good plain collodion, rendered sensitive by the means we have frequently described, it is sufficient to treat the edges of the film with lac varnish or a solution of wax in benzole, to prevent any risk of losing the film; whilst, as regards blisters, we have seen none whatever.

On the question of fading, we shall be glad to have the experiences of any of our readers. There is absolutely no reason why such pictures should fade; they should be amongst the most permanent of pictures. There is no insoluble compound of any kind formed between collodion and silver, and nothing whatever present which, if the print is perfectly fixed in fresh hyposulphite, and well washed for a few minutes, should cause the slightest change.

Critical Notices.

THE COLLODIO-ALBUMEN PROCESS, AND OTHER PAPERS. By James Mudd. (London: Thomas Piper.)

The appearance of the little volume before us will be hailed with the heartiest welcome by photographers, Mr. Mudd is so well known throughout the photographic world as *facile princeps* in dry-plate photography, that notwithstanding he some years ago published a detailed account of his mode of working in our own columns, any additional word he may have to say, either on the collodio-albumen process, the mode of producing artistic landscapes, or on any other subject, will be listened to with eager interest.

In this *brochure* Mr. Mudd has collected together various scattered papers contributed to our own and other pages during the last six or eight years, and has also added some original matter. The contents of the papers include both practical and humorous subjects, and Mr. Mudd is equally at home with both. Photography is not usually a funny subject; but the photographic world has its ludicrous side, some phases of which Mr. Mudd has depicted with a delicate humour, governed by a kindly geniality, rarely met with. There is no bitterness in his laughter, no concealed spite in his fun, no personality in his satire, nothing unhealthy or small in the spirit which animates the articles.

The collodio-albumen process, to which Mr. Mudd has, from the first, faithfully adhered, whilst other dry-plate men have gone after strange loves, is described here in fuller detail than before, the paper on the subject having been entirely re-written and considerably amplified. In working this process Mr. Mudd has gained, as photographers know, not merely

> "The praise which comes to constancy,"

but the highest practical success which has ever been achieved by dry-plate photography. The process, he says, should be thoroughly understood and practised; "it then," he adds, "becomes most certain in its results, so that out of fifty plates exposed on a tour, there need not be one failure;" and, with great reason, he adds, "this can scarcely be said of any other dry process." The great amount of success which has attended Mr. Mudd's operations has produced an effect common in a certain class of minds, namely, the belief that he had some secret mode of working, which he never disclosed. Some persons are incapable of believing that results superior to their own are due to superior skill; they are ever ready to believe in some "secret dodge." Mr. Mudd very emphatically disclaims any secret, and says, "*everything I know about the process is written here.*" This, although most minutely detailed, and so clearly stated that the dullest comprehension must understand it, is comprised in twenty-three post octavo pages. There are no bewildering statements of a score of ways of effecting the same thing, of which the writer is quite incapable of saying which is best, and if he commits himself in one paragraph to an opinion, destroys it in the next by a qualification; here the instructions are plain, simple, and straightforward, and it only remains to add Mr. Hughes's famous recipe for success—the use of brains—for the photographer to proceed straightway and emulate Mr. Mudd's results. As every photographer who practises dry photography will procure this book, we need not summarize the process here, but, for the interest of general readers, we will make an instructive extract, well worth studying, on—

THE MODE OF DEVELOPING.

"Before commencing, refer to your notes, made during the tour, to see what the subject is you are about to develop, what exposure it had, and so on. This will guide you as to the treatment the plate should receive. If the right exposure is supposed to have been given, proceed in this way:—

"Take a small quantity of *dry* pyro from the bottle—say about two grains; put it into a clean measure, and then add about an ounce of water. The pyrogallic acid will dissolve immediately; it needs no filtering, but can be poured at once on the plate. Pour off and on repeatedly. In a few minutes the sky will appear, and, later, several high lights of the picture. Go on, however, until the foreground becomes just visible. Look *on* the picture at this stage, and not *through* it. The details are seen by reflected light, but they are too faint to be viewed by transmitted. Take care not to go too far in bringing out every detail, as the subsequent blacking up will bring out more, and fog the picture, just as *over*-exposure does. On the other hand, do not stop using the plain pyro too *soon*, or the after operations will still leave details undeveloped, making a black and white picture, just like the effect produced by *under*-exposure. This is, indeed, the most important moment. On your decision now depends the quality of the resulting negative. At this point of the development, therefore, it is necessary for a few seconds to throw a strong light upon the plate, that the exact state of the developed image may be known. To do this, either draw aside the yellow blind, or, if it is night, take the plate close up to a candle, or near a gaslight, and survey it carefully. As a guide to judge of its condition for blackening up, it may be said that *all* the details must not be visible; there must be a considerable amount, amongst the brown image, of clear yellow iodide film, to all appearance unaltered. It will require much practice to judge this rightly. Arrived at this point, however, when the plain pyro has produced the development necessary, take an ounce of the acid pyro from the bottle, and two or three drops of the silver solution. Pour on the plate, and now begin to watch the picture by looking *through* it, as the warm brown image produced by the plain pyro will give place gradually to more deep and intensified details. The developing solution will turn red, but if clear, go on with it; if muddy, make fresh solutions with *more* acid. At this stage examine the plate, to see if there be any deposit of dirt on the surface. If so, run water over, and clean the surface with a tuft of cotton wool, the plate being covered with water at the time. This cleaning may be required several times before the picture is finished. After washing, go on with the development, perhaps this time using double the quantity of silver, and more acid. Pour on and off continually, never allowing the solution to rest long on the surface. The picture will go on deepening. If it should be tedious, intensifying slowly, add some dry pyro to the two-grain solution in the measure, with a little more silver and acid, and this will give more vigour to the negative. As the blackening approaches the proper point, it is well to stop, wash the plate, and study it leisurely. It is not easy to determine when the right depth is attained—a depth that will give at once a print brilliant, yet soft, and full of detail. Do not judge by the sky; as a rule, the sky in a well-developed picture will not be black when finished, and will require blacking out by hand. Sometimes there are subjects which will admit of a further blackening of the sky, after the rest of the plate is done, by developing that part alone.

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* Since this article was in type, we have received from Mr. Black, of Boston, U.S., some of the most charming examples of collodio-chloride pictures we have seen; and as he was the first, we believe, to produce them in America, and has not found this defect, fading does not appear to be prevalent even across the Atlantic.

"Such is the treatment a well-exposed plate requires. Let us now develop one which is *very much under-exposed*. It may be the operator is not aware that such is the case, but finding the ordinary method, above described, does not bring out the image, he suspects the exposure, and commences to use means of *forcing* the development. In cases, then, where the plain pyro does not act soon, take warm water, instead of cold, for the solution. If this does not have the effect desired, try still warmer solution, and also more pyro (say double the quantity). In cases of a bad kind, use the water at boiling point, and the pyro solution twenty grains to the ounce water. It is only in extreme cases, however, that such forcing is necessary, and the plate must not be an old one, or decomposition will be set up rapidly in the film, and the whole surface turn red and foggy: only a very new plate—say a day or two old—in warm weather will stand such violent treatment. When the image has thus been forced out, blacken up, as before, with acid pyro and silver very slowly. It may be mentioned here, that when once the *acid* pyro has been applied to a plate, a return to the *plain* pyro is useless; it has no longer the power of producing any more detail.

"The behaviour of an *over*-exposed picture is this:—On applying the plain pyro, the sky will appear, very soon followed—almost immediately—by other portions of the subject. At once pass water over, and proceed with acid pyro and silver; or, if the plate *be known* to have had too much exposure, before beginning, it is best *not* to use the plain pyro at all, but to commence with acid pyro and silver, without waiting for details, so that the image may develop and deepen simultaneously. Use plenty of restraining acid in the solution.

"There is a very convenient way of developing a lot of pictures, especially should they be small ones—say 7 by 5. Fill a clean glass dish, about a quarter of an inch deep, with plain pyro solution, 2 grains to the ounce of water, and, after wetting the plates, put several of them into the mixture, face upwards. Gently move the dish at intervals. When one of them is developed to the point requiring blackening, take it out, and finish it on the stand with silver and acid pyro, at the same time putting another into its place in the dish. Thus you will have a succession of them, coming round in preparation, as they are finished with silver. They may remain for hours, or even days, in the solution, changed now and then; but in obstinate cases of under-exposure of this sort, hot water is the best treatment. Should more than one be ready for deepening at the same time, they can be put into water to wait their turn. Add to the water a drop or two of the citric acid solution.

"When plates are old, and decomposition has commenced, the dish development is a very good plan. A plate that has been kept too long turns red during the development, and, as it is blackened up, becomes darker and redder to the end, rendering it quite useless. Hot water would give them no chance in this state."

The article on "Composition and Landscape Photography" will be read with delight as well as profit by every photographer, wet and dry, as much for the warm appreciation of the beautiful in nature it evinces as for the excellent practical hints it conveys. A paper, not before published, entitled, "Confessions—by the Discoverer of the Gin-and-Water Process," is an admirable satire on the rival claims of process manufacturers. To avoid any possible personal application at the present day, the period is laid some time back, just when photography was emerging from its days of "drowsy repose," when a sitter, "with his face white-washed for greater rapidity of action," was left sitting in the garden for "twenty minutes in good honest sunshine, whilst you took a turn in the shrubbery with a cigar!" The "Confessor" sighs over these departed days. Listen to him:—

"Arcadian repose, this! a very photographic Paradise! These were the days when men loved good solid apparatus, and had no idea of light or fancy constructions; when lenses were ponderous engines of brass, with brazen-handled caps, like warriors' shields; when cameras were built, not for a day, but 'for all time;' square, unyielding brass-bound chests of wood selected for its weight, mounted on stands whose double-jointed-legs, iron-spiked, would bear an avalanche! These were, indeed, formidable weapons in appearance, but were wielded by a patient and simple race, who lived at a period of quiet and repose unknown to modern photographers. No rude innovations then disturbed the minds of men; no lenses of new forms and angles; no processes, at rapid intervals, to distract and confuse; no puffs of photographic quacks; no squabbles of rivals to photographic fame; no Journals to publish them!"

How rudely this repose was disturbed by new processes; how the ardour of invention seized the writer; "how he desired to do it, how he did it, and how he wished he hadn't done it," are all duly recorded in the "Confessions." In describing what he terms the "personal and abusive stage" of the controversy, we are as forcibly reminded of the attitude of some of the vendors of art nostrums in this day as of the process-mongers of a past time. The considerations of the advantages of wet and dry processes, the sorrows of the Unfortunate Photographer, and the "vision of the future, all the wonder that will be," as seen in the "Photographer's Dream," are all duly set forth in this little work, which will find a place in every photographer's library.

ABOUT ENLARGEMENTS.—A SIMPLE METHOD OF PREPARING THE SAME FOR TINTING AND MOUNTING.

BY A PRACTICAL MAN.

It is pretty well understood that enlargements as a rule require a little touching up by hand. In this paper I shall not go into the "black and white," or the sepia process, the chalk method, or the oil method, but confine myself simply to preparing them for "tinting with *water colour*." The other methods have many admirers, and some few who do them do them well; but for the most part, they are "soot and whitewashy," the chalk ones "Harlequin jacketty," or, as regards oils, mere dabs and daubs; all the tones and gradations of the photograph obliterated, and a Birmingham tea tray effect obtained. However, tastes vary, and to those who desire and are satisfied with such things I have nothing to say.

In the mounting and laying down I shall not enter on the method of straining on canvas, holland, or linen, but simply to a laying down on pieces of pasteboard, which will allow of the enlargement being rolled up and sent through the post, an inexpensive and accommodating plan for those photographers who have to get their work done by tinters at a distance.

Articles Necessary to Work With.

Mill-boards.—These can be had, varying in dimensions, from 17 by 14, to 32 by 26; and in various qualities of *thin*, *common*, and *thick*.

Paste-boards.—These can be had as *royal*, *demy*, and *foolscap*.

Brushes.—The best sable hair should be used, as they keep their points, and prove the cheapest and most satisfactory in the end. They are made as *crow*, *duck*, *goose*, *swan*, and *eagle*, and vary in price from fourpence and sixpence each up to eighteen shillings and a pound. One or two flat Siberian brushes, from two to four inches wide, will also be necessary for laying on size, preparation, or varnish.

Colours.—Those known as moist colours in tubes or pans, from their exceeding fineness and freedom from grit (being ground by powerful machinery), will be found to work better than the general run of cake colours.

Oxgall.—This can be procured ready made, in bottles or pans, or prepared by mixing a gall with a little salt and alum, and then simmering (not boiling) the same two or three times over the fire; when cold and clear, strain for use. A piece of clean soft sponge, a good shoemaker's knife, an oil-stone, a long flat rule with a good even edge, two pieces of heavy board, similar to a shoemaker's cutting-board. The above will be found the most useful and convenient necessaries to work with.

To lay the enlargement down.—Take a sheet of paste-board, and see that it is free from dirt, grease, or lumps, then coat the back of the enlargement with a layer of strong paste or starch, well rub the same about with the hand, and allow it to soak well into the paper. The advantage of this will be found that on drying, and when the tints come to be washed in, they will remain more on the surface of the paper, be much brighter, and not so liable to sink in. When the enlargement is sufficiently pasted and soaked, lay it on the paste-board, cover it with a sheet of clean paper, and smooth down with the hand, pressing out all air-bubbles and lumps; then lay in any convenient place and allow it to dry and curl up at will. When about three parts dry, lay it on one of the smooth heavy pieces of board, face down, then another heavy piece being placed on the back, and a heavy weight or press brought to bear on the same. After a pressure of some hours it will be found to be as smooth, and, as the old saying is, as flat as a pancake, and ready for tinting; the first step towards which is to wash over the enlargement with a soft sponge dipped in clean soft water, then brush over with the flat sable brush dipped in a weak wash of gall and water, and, when dry, proceed to lay on the tints, made as required from the various tube colours.

This I must leave entirely to the skill and judgment of the manipulator, giving this necessary and simple piece of advice,—lay the tints on thin and cautiously. You can always add to, when it would often be difficult to take from. The various hand-books on colouring can be consulted, and much information gleaned from the same, as to the colours to be used, the mixing, &c., &c. I should also recommend a careful perusal of the very excellent article on "Artistic Colouring," in No. 398 of the present volume. We will now suppose the picture tinted, when the operator may proceed to a very necessary and, in skilled hands, most effective method of bringing out the proof; namely, glazing, either with the preparation known as megylp, or repeated thin washings of gum-water; these, if judiciously applied to the pupils of the eyes, shadows under the same, dark parts of the hair, face, or dress, will cause the picture to come out in bold relief. When all is finished and dry, give it another good pressing between the two boards, or let it remain all night between glazed boards in a printer's press. The proof now wants the further addition of a cut-out mount, with from two to three inches of margin all round, and a thin gilt line on the inner edge. They can be procured ready made and of any size of the professional mount makers, but are too thick to roll, which would crease, crack, and spoil them. The plan I am about to describe will furnish a very effective cut-out mount, that may be rolled up with the enlargement, and sent by book-post without fear of injury. Take a piece of three or four sheet white card-board, and, with the flat rule and lead pencil, mark the desired opening to be cut out; then place the card-board on the heavy smooth piece of wood, used for pressing the enlargments, and with the shoe-maker's knife, well sharpened on the oil-stone, cut the piece clean and carefully out, then cut strips of gilt paper that have been previously pasted down on thin cartridge paper, and fasten the same with gum or mouth glue to the back of the cut-out mount, allowing about one-sixteenth of an inch to show all round. When dry, it is ready to fasten on to the picture with either thin glue or thick paste, when a final pressing will render all complete. If the articles have to be sent by post, the glueing or pasting down must be done by the person who last receives them for framing and fitting up. In arranging for the framing, the thin paste-board on which the enlargement is fastened can be glued down to a mill-board and coated with a damp-repelling solution of india-rubber, or a piece of the thin plain preparation known as *linoleum*; this will effectually preserve the picture from damp or mildew. Some give their pictures, after a coating or two of parchment size, a final coating of *copaline*; this brings the whole up with a varnished surface, and can be adopted or not as the fitter-up pleases. The above will be found a plain, straightforward method of proceeding to work, but amateurs and others must bear in mind that much that appears simple and easy to a looker-on has been acquired by constant practice and attention, and without this little success or skill and confidence can be acquired. Method and touch are the principal requirements for tinting enlargements in an artistic and satisfactory manner, and which, with a little attention, patience, and perseverance, is within the grasp of most photographers, and specially adapted to the quick eyes and delicate handling of a large number of females.

A Few Concluding Hints.

Paste.—In making it, put in some shreds of isinglass, and a small piece of alum; this will keep it from getting mouldy.

Size.—This is best made by boiling down shreds of parchment or an old *white* kid glove. Most of the gelatine sold in packets is good, but the common kind sold loose may do for making penny jellies to be swallowed by the heated and thirsty votaries at nine-penny assemblies and two-penny concerts, but is utterly worthless and useless for all artistic or photographic purposes.

Varnishes.—These can be made by using *Canada balsam*, *artist's copal*, or dammar. Of the two latter, the first is tough and durable, the second bright and colourless. They are better procured ready prepared, and should be applied in some warm place, perfectly clean, and free from dust.

A fine surface or gloss may be given to paper pictures by a paste made with pure white wax and turpentine. This is evenly and lightly rubbed over the picture, and, when set, polished with a piece of *worn down merino*, taking care to rub only one way.

A Hint to Workers up of Medium Enlargements.

The Hardingtype.—Forty years back, a fancy repository in Greek Street was famous for a display of male and female heads exquisitely stippled and finished up in water colours. The artist had been an engraver and pupil of Meadows, who was at that time popular, from having engraved Westall's famous picture of "The Storm in Harvest;" so, finding these coloured heads more profitable than dot and stippling on copper, he worked himself quietly into fame and fortune; and having had many opportunities of seeing one of his pupils at work, and doing a little in the same way myself, I shall proceed to explain the method, and think the same might be applied with good effect and success to some descriptions of photographic proofs. The method was as follows. The drawing or design of the outline of the face, head, and hair, was cleanly and firmly made on tracing paper. This is not exactly necessary in the first instance, as it may be left till the last. However, a *fac simile* of the tracing is made on good thin card-board (a board free from pressing or glaze is the best). The drawing is then coloured and stippled up to as high a degree as the artist may think proper, finishing with a wash of what was termed the *pearly tint*, composed of *madder lake and cobalt*. The drawing was then held up to the light, and the outline traced with a pencil on the back of another piece of cardboard, somewhat thinner than the one with the coloured subject. A tracing of the head and face only must be made, and the same cut out with a very sharp knife. This is now placed in front of the coloured picture, and then twined down on to a slab of thick plate glass, held firmly in position, and all that portion of the head, face, and hair within the traced outline, well rubbed down with a piece of bone or ivory. If this is neatly and well done, the face will be found to bulge out in relief from the head and shoulders, with a fine ivory glazed finish, and when pasted or glued on another card mount in such a manner as not to interfere with the pressed out-portion in relief, the effect is very good, quite in the cameo way, and a very *old move, and never patented.*

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ON THE BEHAVIOUR OF IODIDE OF SILVER IN THE LIGHT.*

BY DR. W. REISSIG, FORMER ASSISTANT OF PROF. BUNSEN.†

The solution of silver which was used in these experiments had a decided acid reaction.

By synthetical trials, which I made especially for that purpose, I ascertained the possibility of recognising free nitric acid in a ten per cent. solution of silver by the aid of litmus paper, when only one part of anhydrous nitric acid was present in 10,000 parts of liquid.

The presence of free acid in the solution of silver only permits the conclusion of its being nitric acid. Should there be formed by the exposure some iodic acid, *i.e.*, iodate of silver ($\mathrm{Ag\,I + AgO\,NO_5 = AgO\,IO_5 + N}$), it would not be possible to observe an acid reaction.

Notwithstanding this, and as the two processes could proceed both near each other, I did not forbear making the trial on $\mathrm{I\,O_5}$. A larger quantity of the irradiated iodide of silver with the solution of silver was put into a sufficient quantity of water, and, by entire avoidance of light, precipitated with chloride of sodium, but without an excess of it; the liquid was then diluted, filtered, dried and heated with coal and carbonate of soda. The well-known reaction of iodine with fuming nitric acid did not enable me to recognise in the mass any iodine. Also, the warming of a small quantity of these remains (which has not been treated with coal, but only with nitrate of soda), with pure concentrated hydrochloric acid, and introducing the vapours into a solution of iodide of potassium, delivered a perfectly negative result. Therefore iodic acid did not exist here.

There remains still the analysis of the exposed iodide of silver. By digesting the compound separated from the solution of silver with concentrated $\mathrm{Na\,O,\ S_2\,O_2}$, in order to remove the undecomposed iodide, it leaves in very minute quantities a brownish black body, which distinctly presents some spangles of Ag when it is treated with carbonate of soda and potash upon charcoal before the blow-pipe, and the mass triturated. The result shows the presence of iodine in the solution of the heated mass, though several times I did not succeed in proving it, because it is only with minutest quantities that this proof can be undertaken. Nevertheless, it results from this that the iodide of silver exposed for a longer time to the light is changed into a lower compound, probably into proto-iodide of silver (Ag2 I). By this proceeding I could not prove the presence of any free metallic silver. Therefore the reduction of iodide into metallic silver does not take place as already mentioned elsewhere. The resultant body also corresponds in its properties with the compound obtained after Dr. Vogel's method, namely, when iodide of potassium is left acting upon protochloride of silver. It appears to be soluble with difficulty in a solution of iodide of potassium, and is not changed or dissolved by $\mathrm{N\,H_4\,O}$; however, it does not resist when treated with concentrated nitric acid. We cannot find out with certainty if the body in question still contains some oxygen; for that reason I leave this undecided till a future time, though it seems to me unlikely.

The observation I made two years ago, of the possibility of producing direct images by long exposure to the mere action of light, is most interesting in reference to photography.

The change which the Ag I in a collodion plate under $\mathrm{AgO,\ NO_5}$ undergoes by the action of light, is manifested by a negative image, which appears without further ceremony when the plate is kept damp sufficiently long, and this is remarkable, in as far as such images have not hitherto been observed.*

I have still to mention that the solution of silver upon such a plate equally shows an acid reaction, and that this acid, produced by the exposure, is spread most strangely over the portions lying the nearest to the exposed part of the plate.

Of the highest importance for theoretic photography may be considered the change which tests the iodide of silver upon a collodion plate by very short exposure and under solutions of silver, not too much concentrated nor diluted. Microscopical examinations and chemical reaction do not permit us to perceive either a physical or a chemical change of the film, until a solution of protosulphate of iron, mixed with acetic acid, is poured over. In this case some metallic silver is set free on the exposed parts, which proceeding I cannot further pursue here.

If a perceptible separation of iodine by short exposure had taken place, no doubt the quantity of Ag of the solution which was in contact with Ag I would have been diminished. The analysis, of which I can omit the particulars, gave—

A. Solution of silver (saturated with iodide of silver) without exposure.	B. Solution of silver (saturated with iodide of silver) after an exposure of 15 seconds.
9·47 per c. Ag	9·41 per c. Ag
9·53 per c. Ag	9·44 per c. Ag
Medium 9·50 per c. Ag	Medium 9·43 per c. Ag,

differences which rest within the limits of failure of the analysis. Notwithstanding that a chemical decomposition of the Ag I has taken place, as it results from the following:—

1. Upon a plate presented to light, and carefully washed and kept damp in the dark, an image can be developed with a solution of iron after leaving these plates for whole days.

2. A plate which was exposed being treated with hyposulphite of soda, in order to dissolve the unaltered iodide of silver, gives an image with solution of protosulphate of iron and silver.†

3. But, as I have observed, no image appears under these conditions if the fixed plates are treated with iodized water; it is ascertained by it that iodide of silver, being exposed, was changed into a lower compound of iodine with silver, which is transformed into common iodide by the admittance of iodine. Especial interest is excited by the behaviour of iodide of silver when exposed to the light in contact with an entirely saturated solution of lunar caustic. Chemically pure Ag I, flooded with such a concentrated solution, or placing upon iodide of silver (lying under diluted solutions of $\mathrm{AgO\,NO_5}$) a piece of crystallized or melted nitrate of silver, that dissolving in the liquid impregnates the iodide of silver in concentrated solution, this latter (Ag I) separates in a short time, in the diffuse daylight, a reddish body, resembling iodine, which covers it in thin layers.

The trial undertaken thus, shows that when the Ag I is struck directly by the sunbeams, the reddish body changes into yellow Ag I, but only on the places upon which the direct light is acting; then the liquid shows an acid reaction too, and contains some free nitric acid. Therefore, as we have noticed, this by more diluted solutions is decomposed by the light, and through the action of iodine on $\mathrm{AgO\,NO_5}$ and oxygen.

A similar alteration occurs on adding to the red-coloured iodide (with $\mathrm{AgO\,NO_5}$) some pure water, or another aqueous solution of a salt. Drying the mass by cautious evaporation on the heat of the air, with perfect avoidance of dust, and pouring over it some chloroform or bisulphite of carbon, its reddish colour is not altered at all, only the mentioned bodies do not withdraw from it a single trace of iodine. By cautious heating of the mass till over 100 deg. Cels., there is likewise no iodine sublimating; we are even enabled to heat it till to the melting of the admixed $AgO\ NO_5$, without making the reddish colour disappear.

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* Continued from p. 221.

† *Photographische Correspondenz*, edited by L. Schrank.

* After the publication of my first treatise such images had also been observed in England.

† Schnauss' "Nachschlagebuch," page 148.

These trials equally do not prove anything else, but that not being iodine, the body separated from Ag I, under the concentrated solution of silver, but a superiodide of silver, though this may at first appear improbable. I freely yield hereby that, nevertheless, this questionable body may be iodine, which in intimate contact with iodide of silver cannot be separated from it by all remedies; but this being the case in fact, only the above-expressed opinion may be considered as the grounded one.

Recent Patents.

IMPROVEMENT IN PANORAMIC CAMERAS.

BY JOHN ALEXANDER ROWLAND.

This invention received provisional protection only. Its object is stated as follows:—

My invention of improvements in photographic cameras relates to a novel mode of constructing cameras so that large pictures or panoramic pictures may be taken with lenses of moderate size; by this means an instrument of large capacity, and capable of producing large and extensive views with great accuracy and without aberration, may be constructed at a greatly reduced cost.

In carrying out my invention, the lens is mounted in a brass chamber or slide, to the end of which is adapted a diaphragm chamber, the aperture of which is of a long narrow form placed vertically. The lens chamber is held in a vertical position by means of two fixed studs, which work in grooves made longitudinally along the top and bottom of the dark chamber. The lens is also maintained in its proper vertical position by a similar arrangement. The image from the lens passes through the long narrow vertical opening of the diaphragm chamber to the sensitive surface of the plate. By traversing this long narrow opening of the diaphragm chamber along the grooves provided for the purpose, the changing image from the long narrow opening falls on to the sensitive surface, and the photographic image is thereby impressed on the sensitive surface. The traversing motion of the lens and diaphragm is effected by toothed gearing, or by a screw working in a nut connected with the diaphragm chamber; and this mechanism may be worked by means of a winch with an uniform slow motion adapted to it, or the diaphragm may be moved by means of a cord or chain actuated by clockwork, capable of being driven at a regulated speed, according to the state of the atmosphere.

PHOTOGRAPHIC PORTRAITS ON CERAMIC WARE.

BY ALFRED GRAINGER AND C. M. GIRDLER.

The object of this patent is to secure a method of producing photographic enamels. In what the novelty of the process consists, or how good enamels are to be produced by such a method, we are not able to see. The specification runs as follows:—

Our invention relates to the production of photographic likenesses on porcelain or other ceramic ware, and consists in producing the photograph or likeness of a person or thing on to the ware itself, instead of taking representations on paper or other material, and then transferring it to the earthenware, to be afterwards burnt and glazed as heretofore. We prepare a plate, or other article, of the size and shape required, of porcelain, clay, or other ceramic material, which we face with enamel and a transparent glaze in the ordinary manner of glazing porcelain, and bake or burn it on as usual; on this plate or surface we take the likeness by means of photography; that is to say, prepare a negative, and then print or transfer it to the porcelain surface in the manner usual in the production of a positive photograph. We then paint or colour the photograph, so taken, by hand or by other application of metal colours as usual in painting china ware, the beauty of which will, of course, depend in a great measure on the more or less artistic application of the colour. We now glaze the surface again, and bake or burn it in a muffle or otherwise, as well understood in the porcelain manufacture, and thus complete the article bearing such portrait or likeness. Instead of colouring the photograph before glazing a second time, it may be left uncoloured, and with the effect produced by photography alone, which is glazed and baked or burnt in as before mentioned. In some cases, we omit the second glazing, as, for some purposes, it may be unnecessary, and permits of the production of more delicate effects. Borax, or other flux suitable for the colours, is used in glazing, which is applied and fixed by a heat of about 400°, as well understood in glazing ceramic wares. Portraits or representations of persons and things thus produced on porcelain are exceedingly truthful, and, in addition to obtaining a good and truthful likeness of a fixed character, will be enduring, although exposed for a great length of time to the influence of the weather, and will equally resist damp in close situations, or the effects of attrition and rough usage. Besides being a good medium for the portrayal of likenesses in general by photography, such photographic representations are admirably adapted when required to resist the effects of time, such as under the foundation-stones of public or private buildings and otherwise. Instead of the plate or substance on which the photograph, portrait, or likeness is produced, being entirely of ceramic material, a surface thereof may be prepared on a plate of metal or other material, on which the photographic representation may be taken, and which, in other respects, is treated and prepared as herein-before described, the glazing and baking rendering the representation enduring and applicable as herein-before described with reference to plates or pieces entirely of ceramic material.

MICROSCOPIC PHOTOGRAPHY AND THE PHENAKISTOSCOPE.

BY GAETAN BONELLI.

This invention consists in a novel combination of the phenakistoscope and photography, and is described as follows:—

It is a well-known fact, based on certain optical conditions, and by the use of an instrument known as a phenakistoscope, that an appearance of motion or animation may be given to pictures or subjects that have been expressly drawn or photographed for the purpose. The phenakistoscopic apparatus or instrument being known, it will not be necessary to state how the pictures are arranged to produce the optical illusions; it will be sufficient to say that an identical result will be obtained with images or pictures of small size, and even reduced to a microscopic scale, if to each of the images or pictures a lens is applied. It is only by the application of as many lenses as there are images on the disc, and not by the successive passage of all the images under a single lens, that the effect will be obtained. Thus, if a disc carries sixteen images, as many lenses or magnifying apparatus would be necessary, which receive a rotary motion in the same direction as the images before which each lens will be respectively placed.

The pictures or images thus reduced enable me to construct phenakistoscopic apparatus, whether simple or stereoscopic, of sizes and shapes not hitherto done, and thereby forming a novel application of microscopic photography.

In carrying my invention into effect, I avail myself of every aid that optical or mechanical science may afford to enable me to reproduce subjects of different forms, kinds, arrangements, and sizes which cannot be obtained without the use of lenses arranged in the manner herein-before described.

And having now described the nature of my said invention, and in what manner the same is to be performed, I declare that I claim as my new or improved method of obtaining or producing optical illusions, the application of pictures or images of small and even microscopic size to simple or stereoscopic phenakistoscopes, by the employment of as many lenses as there are pictures or images on the disc, all substantially as herein-before described.

RESEARCHES ON THE LATENT IMAGE.

BY M. CAREY LEA.*

In studying the origin and nature of the latent image, it recently occurred to me that no confirmation of the physical theory could be more striking than that which would result, if it could plainly be shown that a purely physical cause, independently of light, was competent to control development; and that if this cause was not merely physical as distinguished from chemical, but also purely mechanical in its nature, there would result an inference which the advocates of the chemical theory would find it exceedingly hard to countervail.

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* *Philadelphia Photographer.*

I therefore subjected this to trial, and succeeded almost at once in obtaining results that certainly are very different from anything heretofore published, and which at least prove that a physical cause may be amply sufficient to impart to a sensitive plate the capacity to afford an image under development.

As I before said, the form of physical force which I selected was mechanical, simple pressure; and this, I find, modifies iodide of silver in such a way as to make it capable of receiving a development. The following are the principal experiments, selected out of all that I made:—

Experiment 1.

An orange-wood ruler was selected, in which the letters composing the word "Sorrento" had been carved in open work, cut entirely through. A plate was sensitized in the usual manner, and then, without removing it from the dark-room, the ruler was laid upon the sensitive film, and whilst the glass rested on a firm support, the ruler was powerfully pressed down upon it by the full strength of the two hands, and kept so for twenty or thirty seconds.

The ruler was then carefully lifted off, and the plate developed with an iron developer. The word immediately became visible.

Precisely as I expected, it was the parts which had been pressed that received the silver deposit. Had the reverse taken place, it might have been said that the ruler carried away a portion of the silver solution, so that the letters were left with more nitrate on them; or that the faint light of the dark-room had acted on the open part under the letters, whilst pressure was applied. But even these futile objections cannot be urged, when it was precisely the portions that had been covered which were darkened by development. Repetitions of the experiment gave the same result.

Experiment 2.

A piece of letter-paper was taken, on one side of which some words had been printed, so hard as to show the lettering through—that is, the back of the paper was slightly raised by the pressure of the type on the other side. This paper was laid on the sensitive film, printed side up—that is, away from the film—and the finger was drawn several times over the lettering, with a moderate, steady, and careful pressure. The paper was then removed, and an iron developer applied. Presently the lettering came out, plain and distinct, on the iodobromized film, though the type was small.

It will be observed that the printing was not in contact with the film, so that no argument as to different natures of surfaces can be applied. And as the paper was sized and thick, and the printing old, it cannot be contended that its influence passed through the paper. The case was therefore, as before, one of simple pressure. The lettering came out dark—that is, just as in the previous case—it was the portions which received the pressure that took the deposit of silver.

Experiment 3.

This experiment was perhaps even more striking than the foregoing. An embossed card with raised lettering on it was placed face downwards on the film (sensitized in the usual way), and was gently and steadily pressed down by drawing the finger over the back. The application of a developer produced a clear and distinct image of the lettering. A part of the film adhered to the card, and came away, but a very much larger part remained on the glass, and exhibited the results just mentioned.

In this case, as in the former ones, it was the projecting portions, the lettering, which received the deposit of silver. Wherever the pressure was greatest, there came the deposit.

I need scarcely say that these results require some little care and nicety in manipulation, to obtain them clearly and plainly, though not an exaggerated care, and they generally succeed at once. A strong developer is required, which must carry its action so far as to veil the plate. The lettering, marks, &c., then come out clearly and plainly, and the plate may be fixed with hyposulphite in the usual manner. I have developed both with ordinary iron developer and with collo-developer.

No proof, I think, can be more striking than this, of the capacity of a purely mechanical cause to give rise to development. In every case, it will be observed that the heavier deposit of silver followed where the pressure had been, indicating that in some way that pressure had predisposed the film to receive the silver; in other words, a true latent image had been formed by a purely mechanical means, just as truly as by the agency of light, though less powerfully.

All objection, therefore, made to the physical theory, as furnishing an explanation insufficient for the effect, is removed by these facts.

These experiments, however new in themselves, are but the logical induction from what I have published before on this subject. I have always been struck with the phenomenon of the deposit of a precipitate, following the stirring of a glass rod, and making evident all the lines which it had traced, and have mentally compared it with photographic development, as often as such a result happened in the course of my chemical investigations. The phenomenon of development, as I have before said, I regard as one of simple precipitation, which elects to form on those parts that are most predisposed to receive it. In the case of the iodide film, it is those parts which have received one sort of physical influence; in the case of the glass sides of the vessel, it is those parts which have received also a physical influence, but of a different description.

I cannot but think that these experiments will afford a most telling argument in favour of the physical theory, and one which its opponents will find it difficult to explain away. Here is no possibility of reduction, no possible production of metallic silver or of subiodide, no possible elimination of iodine, and yet a developable impression is produced, which comes out plain and strong under the action of a developer.

It is almost superfluous to remark that the foregoing experiments may be almost indefinitely modified, the one essential thing only seeming to be pressure. Marks made, probably, by any hard body, may be brought out by the development, always the part receiving the pressure becoming darkened in the development. A coin may be fastened to a stick of sealing wax (a silver or gold coin should be used, for obvious reasons), and pressed upon the film. In modern coins, all considerations of beauty are sacrificed to that of "piling;" that is, coins must make a steady pile, and to do this, their edges must be raised higher than the design; consequently, it is difficult to get anything on the film, except the image of the rim. I have, however, succeeded in getting part of the design, by using pressure enough to make the ring cut through the film on one side; the design on that side then pressed against the film, and made itself evident in the development. This experiment is, however, far less satisfactory than those previously described, which, in fact, leave nothing to desire in distinctness of result.

Evidently these experiments may be greatly varied by ingenious experimenters, and the same principle be exemplified in many other curious ways.

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PRINTING WITH A LENS.

A correspondent of the *Philadelphia Photographer* writes as follows:—

"At the request of a friend, we have been induced to offer you for publication our formula for printing vignettes, viz:—

"The negative is made in the usual way, with the exception that you use a cut-off in front of the instrument. This is made of a simple piece of card-board cut in crescent shape, and set in an iron head-rest, so it may be easily adjusted. By this means you cut off the figure at any point desired.

"The negative is then placed upon a common printing-frame, so arranged that you can easily examine your print. If it is a common card vignette you wish to print, take a plain 4-in. lens, set it firmly in the centre of a piece of heavy paste-board about a foot square; this will shade your paper, except where you wish to print. Then hold your lens (in the sunlight) at a distance to form a circle upon the negative about an inch in diameter, moving it so as to scatter the rays, blending the background about the head and shoulders as you desire, and at the same time printing the face evenly, taking care not to burn the print. For larger negatives, use a lens in proportion as above.

"*Advantages of the above Method.*—By printing quick before the paper changes, you get a more brilliant effect. You can bring out a light forehead, or leave the hair light for colouring when desired, and a greater variety of effects can be produced than is possible with a block."

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THE STEREOGRAPH AS APPLIED TO STATUARY, ETC.

BY PROF. TOWLER.[*]

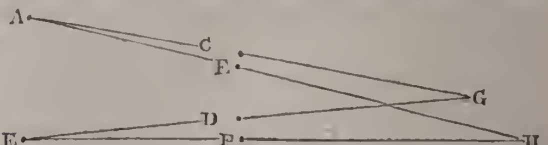
It is not generally known, and only by a few recognized, that when we behold a stereograph, we are in reality beholding a miniature solid image in the space before us, subtending the same angle which the original subtended from which the stereograph was photographed; and yet this is a fact. The solid image seen either by the aid of the stereoscope or by the unaided eyes, is equivalent to a small model of the real object, placed so that two lines which bound two extreme points of the real object shall be tangent also to the two corresponding points of the small model. Now, since all the parts of this model are proportionate to those of its original, there will be no difficulty in fixing the model in such a position as to be comprehended within the same tangental lines.

Many of our otherwise learned men have a false view of the cause of stereoscopicity, and attribute it simply to the superimposition of two pictures by the two half lenses or prisms of the stereoscope. Such a superimposition of two similar pictures produces nothing more than a flat picture similar to either of the two flat pictures viewed. In order that the superimposed pictures may produce the effect of solidity, these pictures must be endowed with a very peculiar property, which property is not visible to the naked eye without aid, but becomes distinctly visible by measurement. This property we may denominate the difference of distance between the corresponding points on the two pictures. For instance, take, firstly, any stereograph that has been correctly mounted; and, secondly, mount the same photograph side by side so as to form another apparent stereograph. In the first case, the left hand picture is on the left side, and the right hand picture on the right side; whilst in the second apparent stereograph the right hand picture has been mounted twice. To all outward appearances there is no difference in these two stereographs; but, on examination with the stereoscope, it will be at once discovered that the former gives a perception of relief, or, as we say, produces a solid picture; whilst the latter exhibits only a picture in the same plane—a flat picture.

We will suppose the two apparently similar stereographs contain for their principal object the "Suspension Bridge over the Niagara." It is easy to distinguish what points in these photographs were nearest to the artist when he fixed his camera to take them, as also those which are most distant. Fix upon these extreme points; for instance, let them be the extreme points or ends of the cables. We will call these points anterior points and posterior points. Now, taking a pair of compasses or dividers, open the legs so as to just comprehend the exact distance apart between the anterior points of the cables in the two pictures of the apparent stereograph. Measure this distance accurately on a graduated scale; we will suppose it to be exactly two inches and one-half. Make a second measurement in the same way with the compasses of the distance between the posterior points of the two cables in the two pictures of the apparent stereograph. Apply this measurement to the graduated scale and read off the indications: you will find it to be two inches and one-half, and the distance between any two corresponding points on the two pictures will be found to be invariably two inches and one-half. This distance in different pictures might be any quantity whatever, according to the size of either picture; thus, if either picture is one inch square, and the two pictures are mounted side by side in contact, the distance between any two corresponding points will be invariably the same, always one inch. If the pictures were one foot square, and they were mounted as before, the invariable distance between the pairs of corresponding points would be one foot.

Let us now proceed to a similar course of experiments with the true stereograph. Measure the distance between the two anterior points of the cables; we will suppose this distance to be two inches and three-sixteenths of an inch. Secondly, measure the distance apart between the two posterior points, and apply this distance to the graduated scale; it will be found to be, probably, two inches and four-sixteenths of an inch. Between the lengths of these two measurements there is a difference, and this difference always exists in the true stereograph, not always of the same amount, but gradually increasing as the object recedes; and yet this difference has a limit. This difference is one of these peculiar mathematical properties which are continually increasing *ad infinitum*, and, after all, can never exceed a given quantity. Thus, suppose the distance between the two anterior points be precisely what we said before, two inches and three-sixteenths of an inch; and, furthermore, that the pictures are mounted side by side in contact, and are exactly two inches and five-sixteenths of an inch in width, this distance being also that between the two lenses when the pictures were taken, then the difference in question can never become greater than two-sixteenths of an inch, and yet it may increase continually from one-sixteenth of an inch until it becomes two-sixteenths of an inch. It is this varying difference, coupled with superimposition, that produces relief. The question now suggests itself: How does this difference produce the perception of relief? or, in still plainer language, how does this difference produce in space a solid picture?

In the first place, our readers must know or recollect that a picture of any point of an object is formed by the *crossing* of the rays of light emanating from that point, and made convergent either by reflection, refraction, or interference. Where such rays cross we find the focus, and this focus being pre-eminently more brilliant than the light from a mere bundle of rays, increases the visibility of this point; but the point is the picture of that point from which the rays originally came. With this preliminary knowledge, we shall now be able to make the subject intelligible.



Let the two dots A and B represent the two eyes, being distant apart the space A B; and let C and D be two anterior corresponding points; whilst E and F represent two corresponding posterior points of the two pictures that form the stereograph; it is evident that the two axial rays of the two points C and D, and passing the one through A and the other through B, will cross each other, whilst similar axial rays from E and F, passing through the eyes, will cross at H; but G and H are not in the same plane, and H being more remote, and being a superimposed picture of the two points E and F, it will exhibit this picture at a greater distance from the eyes than the picture G; but the very definition of relief is that the different parts of an object are seen at different distances. This is precisely the phenomenon of the stereograph analyzed; it is the superimposition of two pictures of the same object coupled with a difference of distance between pairs of corresponding points on the two pictures.

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[*] *Humphrey's Journal.*

But if a solid picture can thus be formed in open space by the simple crossing of the rays of light at different distances, and these different distances are produced by the peculiar difference in two flat pictures above alluded to, it is evident that wires may be substituted for rays, points on a vertical board for the eyes, and that then the crossings of *two* each pair of wires from two corresponding points will give in space the positions of points that will represent the originals from which the pictures were taken. These points may or may not be the same distance apart as the original points; but in every case they will always be at proportional distances apart; and hence a model may be built through these points that shall be similar to the original.

We propose, therefore, that the stereograph be used by the statuary, in order to produce unerring models of subjects without any other aid than that which may be derived from the stereograph itself.

Our plan is the following:—

If an artistic statue of any of our great statesmen, generals, &c., had to be made whilst the model was still alive, we would first place him in the position which art would dictate, together with all the accessories in their due place. Whilst in this position, let two stereographic negatives be taken with a pair of well-corrected lenses; one of these negatives has to be taken especially for solar camera enlargement, and consequently must be full of detail, but not very intense—it must be bright, clear, and transparent; the second negative must possess the ordinary properties of a good negative for contact printing. Measure the height and width of your model, and his distance from the lens, and then let him be dismissed.

Take a copy of the latter negative, and mount it according to art. This will serve for minute inspection as occasion may require. The first negative is now cut in two, and either half is copied twice by the solar camera; the first copy must be of the full size of the original, whilst the second is twice the size of life. A pair of the latter prints are mounted on a vertical plane of boards side by side strabonically; that is, the right side picture is placed on the left side, and *vice versâ*. Erect a similar plane opposite the former, parallel to it, and at twice the distance apart at which the party was placed from the lens. Find the centre of each picture on the stereograph, and opposite to these centres make marks on the other plane; these two marks are to represent the eyes.

Now fix a fine wire, for instance, to the top of the nose of either picture, by passing it through the vertical board at these points, and fastening each end firmly by means of a tack or screw on the opposite side. Stretch the wires to the opposite plane, letting them cross either to the opposite side and pass through the two marks which represent the two eyes. Here they are fixed behind as before. These two wires will come in contact as they cross, and where they cross is the position of the top of the wire of the model you are about to construct of clay, &c. Next fix similar wires to the top of the chin, of the ears, the toes, knees—in fact, to all the prominent parts of the body or subject to be modelled. In every case the crossing will represent the position of the part to be modelled. But without great care distortion may be produced in the relief. To avoid unnecessary labour in this respect, fix two pairs of wires through two pairs of points, whose distance apart in the original would be the width through from the anterior to the posterior direction. If this distance between these two crossings is equal to the absolute distance measured on the original, the vertical planes are at a proper distance apart; if it is less, the vertical planes are too near; on the contrary, if the distance is greater, the planes are too far asunder.

After that pairs of wires have thus been stretched through all the pairs of corresponding points of the two pictures, the statuary begins to build up his model with clay, &c., letting the crossings of the wires be his guides for the position and distance of the different parts to be modelled. The life-size picture will assist in preserving the size, and the stereoscopic print in obtaining the requisite roundness of the contour and the correctness of formation. The wires are easily cut asunder with a pair of shears the moment you have built up to them and round them.

This method is so reliable that geometrical solids can be constructed from the stereograph with the utmost degrees of accuracy and refinement; and, it is to be hoped, that the artist, in like manner, will be enabled hereby to attain to the same degree of accuracy in the formation of statues, &c.

The reader will see that, when the conditions of the art are once understood, a statuary will be enabled to construct a model correctly of a party whom he has seen only in the stereograph, this stereograph being still in his possession.

"But the artist will deride such mean modes of getting his points," you say. This is not so; the true artist knows well that genius alone can accomplish very little, and that he must avail himself of every aid which progress has evolved; it is the shallow artist who pretends to rely on nothing, and to be able to strike out of chaos a charming form with the same facility as you would take the impress of a porker in a thick mudhole.

Correspondence.

THE NATURE OF THE LATENT IMAGE.

Sir,—It may be a grave question as to how far the exercise of the imaginative faculties may be useful to the discussion of questions not admitting of a purely practical solution, but surely science must admit its indebtedness to those who have endeavoured to enrich its stores by their means.

Of the relationship existing between mind and matter, and the power possessed by the mental faculties of controlling and directing, within certain limits, the action of the physical forces, is a knowledge essential to the inquirer into natural truths; he, of all men, ought to possess the power of appreciating at its true value the intelligence of the effects of these agencies conveyed to the mind through its only means of communication with matter, the natural senses; nor, indeed, ought he ever to forget that it is only the effects of the action of these forces, and not the forces themselves, that the senses recognize. However, therefore, immaterial and impalpable they may appear to be (the mind judging by the evidence of senses not intended to be cognizant of their tangibility), this affords no grounds for assuming they are not as material as the solid earth beneath us.

To the photographer, especially, does these remarks apply, as, in endeavouring to discover the cause of the production of the latent image, he has to do with the most subtle, evanescent, and mysterious of all the effects produced by these forces, that of light. In a former paper light was described as the effect of the swift passage of the solar force of repulsion through matter, and that its intensity depended upon the velocity with which it moved; its colour was also there stated to depend upon this velocity, but there are grave reasons for doubting the soundness of this idea. The persistent green in the colour of the light from silver vapour; the yellow character of the sodium flame, notwithstanding the nature of the medium through which they pass; the experiments of Helmholtz, as described in the Photographic News of Feb. 9, 1866, by which was shown that the colour of a luminous ray, when isolated and pure, could not be altered by a change of velocity, all prove that the solar beams are a combination of forces having varying characteristics, each of which is represented in the spectrum by rays of different refrangibilities, and that the marked difference in their effects upon matter is due to a real diversity in the nature of the force in action.

In the production of the latent image are employed only the rays of greatest refrangibility; and it is a well-known fact, proved by numerous carefully repeated experiments, that magnetism can also be produced by the action of these rays. The supposition, therefore, first propounded by Mr. John Jex Long, in a paper read before the Glasgow Photographic Association, Nov. 2, 1865, and more fully discussed by Mr. Nelson K. Cherrill, in the Photographic News of March 2 and 9, 1866, that the cause of the precipitation of silver upon those parts of the film where these rays have passed is local magnetism, induced by their action, was well founded; and it receives strong confirmation from the fact that the action of the rays of lower refrangibility, or rays of heat, are equally destructive to the magnetism of the compass-needle and the latent image. As the injurious action of these rays is but little known or dreaded by many photographers, it is well to warn all operators of their effects, as at a certain temperature, depending upon the character of the collodion, when used for the wet process, and ranging from 80 to 100 degs. Fahr., it becomes an impossibility to obtain a photographic picture with any length of exposure, owing to their interfering action; and a heat of 160 deg. is sufficient to destroy all trace of an image in an exposed plate.

In this description of the nature of the latent image is shown the impossibility of obtaining photographs in natural colours by any process of development, for as the success of this method depends upon the non-luminous rays of high refrangibility effecting a local magnetic polarization or decomposition of the cohesive force in the sensitive film, which action is destroyed if all the rays of the sun are employed, it is evident a coloured image can only be obtained during the action of the luminous rays, and not by any after process of development, depending upon a force of attraction caused by a more or less permanent and continuous decomposition of cohesion. M. Carey Lea's paper in the News of June 1st, "On the Spontaneous Re-sensitizing of Iodide of Silver," contains a description of some experiments which confirms the magnetic theory of the latent image. If an exposed iodide film be isolated from the action of light for several hours, it returns to its original normal condition; similarly, if a compass-needle of soft steel be magnetized, the magnetic action is not permanent, but gradually diminishes. Both, however, can be again and again endued with magnetic power, without the matter of which they are composed undergoing any physical change. Again, if the iodide film is associated with albumen, although its sensitiveness is diminished, the permanency of the latent image is greatly increased; similarly, if the compass-needle is well hardened, although the magnetic power is communicated with greater difficulty, its permanency is also correspondingly insured.—I am, Sir, &c.

Yarmouth, June 4th, 1866. Thomas Ayers.

THE "REASON WHY" ON SUN-PRINTING.

Sir,—While thanking Mr. Bovey for his paper on the theory of toning, I must still be permitted to maintain that his answers to my "objections" by no means prove that sun-printing is "wrong in principle." First, I must disagree with Mr. Bovey's statement that a "perfect negative" is one which "answers the requirements" of any "rule" about the quality of light generally used in printing. A *perfect* negative is, I maintain, one which produces *perfect* prints; and on the theoretical grounds which I advanced, I still think that perfect prints can only be taken in sunlight. The quotation from Sir John Herschel you give on another page is not a little in favour of sun-printing.

I have no wish to overrate the liberality of employers, though I must maintain that, as I said, the "number of frames at work at any given time must be proportioned to the number of 'hands' employed to look after them."

If Mr. Bovey has been accustomed to work with 140 frames at a time, why that is, of course, the proportion which one man can do. My observation was, that with a less number of frames used in sunlight an equal number of prints might be made.

I should be inclined to think that any printing process which demanded attention to 140 different things at the same time could not afford the printer opportunity to secure much individual perfection in any of them.—Yours truly,

Nelson K. Cherrill.

The Royal Oak, Borrowdale, Cumberland.

A "REASON WHY" ACID TONING IS OBJECTIONABLE.

Sir,—If Mr. Bovey can tone rather more with an acid bath than I can with an alkaline (and I am not sure that he can), I do not wish to adopt his plan to make a possible saving at the *risk* of permanence.

I say *risk* advisedly: I should say, *in exchange* for permanence, if I did not feel sure that he takes precautions to neutralize the acid before fixing.

That the fixing bath is readily decomposed by acids he surely does not doubt. If he washes the print between toning and fixing in an alkaline solution, there is still the possibility, unless great care is taken, of some acid remaining in the less-exposed portions of the print when many are washed together.

I once, some time ago, used a slightly acid toning bath, without knowing it to be such. It was winter, and I had some prints, not of the greatest importance, printed on paper sensitized the day before. To remove the faint yellow tint usual in such prints, they were placed in a bath of dilute chloride of lime for about five minutes. The effect was striking: the pictures began to vanish. With an alkaline or neutral bath, no injurious effect is produced beyond a slight roughening of the albumen. The prints had been squeezed nearly dry; so the acid was *in them.* Toning had been neither so quick nor so good as usual with an alkaline bath.

Mr. Bovey likes acid, if for no other reason, to ensure the absence of alkali. For the opposite reason I like alkali, to ensure the absence of acid. So, since that day, a piece of test-paper has been placed in each bath when mixed.

A faintly acid solution of nitrate of silver and tannin makes a delicate and immediate test for alkali. The reddening of tannin plates, the result of underwashing, and called by some the test for washing, is also a proof that the water used is alkaline.

To return to the subject. To some extent I agree with Mr. Bovey, that magnesia plays "no special part" in toning. Its peculiarity is of a negative character. In common with most alkalies, I hold it to be of use in the bath, to combine with the chlorine; I prefer it because, unlike most others, it wastes little, if any, of the gold.

The question of sun-printing is very much a question of the silver bath. If it is weak in proportion to the salt in the paper, shade-printing will give the most vigorous picture. Equal vigour may be obtained in the sun by strengthening the bath.

When the bath is strong above a certain proportion, as far as my observation goes, sun and shade will give similar results.

Sir John Herschel's evidence is certainly strong in favour of sun-printing.—Yours truly, Ed. Seeley.

SENSITIVENESS OF IODIDE OF SILVER, ETC.

Sir,—Mr. Carey Lea's researches on the sensitiveness of the iodide of silver film are highly interesting, and the spontaneous resensitizing of it, as related in your last number, reminds me of investigations and experiments made many years since by Mr. Claudet, on the sensitive film of the Daguerreotype plate, in which, if I recollect rightly, it was found that exposure under a yellow light had the effect of restoring sensibility to a previously exposed surface, and that this could be repeated any number of times. It would be well if Mr. Claudet could be induced to bring together and publish, as a whole, the numerous valuable papers descriptive of his researches, which he has made in connection with photography, and which are now scattered about in various publications, some at length, some in abstract, and, in some cases, the titles only are given. They would be of great assistance to the present workers, and save time and thought, as well as suggest when experimenters are going over the same ground. Our modern workers I see constantly dealing with and experimenting upon matters which they are unaware have been made the subjects of previous research by their predecessors.

To turn to minor matters: there is no novelty in the touching up negatives by means of the lead pencil, as lately referred to in more than one of the photographic journals. When I was in Brussels last summer, M. Ghémar showed it me in regular use in his establishment, and spoke most highly of it. There is no doubt it is a valuable adjunct to the studio. Again, the process of vignetting to which one of your correspondents calls attention in the last number of the News is nothing new. It suggested itself to me, as I dare say it has to many others, many years ago, and I have never found any method so good and easy to work. It is simple and effective. I may add, that if your correspondent will print by diffused light, there is no need whatever of covering the opening with tissue paper; that is only needed for printing the vignettes in direct sunlight.—I am, sir, your obedient servant, P. Le Neve Foster.

RETAINING SPECIMENS.

Sir,—I think the remarks of "A. B. C.," with respect to returning specimens, is one-sided. As an employer of labour, I consider if I advertise for a servant, and request parties applying to send testimonials or specimens, the obligation is mutual; if he expects, by sending his testimonials or specimens, to get a good situation, I expect, by receiving them, to be better able to secure the services of a person suited to my purpose. In the commercial world, it is a usual practice to return testimonials, and, in most cases, to answer applications where no testimonials are sent. In a recent case which came under my knowledge, upwards of three hundred applications were made, and every letter was answered. To say the least of the practice of retaining specimens, it is a piece of unwarrantable negligence.—I am, sir, yours respectfully, W. E. F.

Hunmanby, June 5th, 1866.

Photographic Notes and Queries.

A Hint to Unemployed Operators.

Sir,—I have the pleasure to suggest that good operators, able to produce first-class negatives of any size, to 24 by 19 inches, could, when momentarily out of employment, find a remunerative business to carry on in offering to execute incidental extra works at any photographic establishment in want of such extra help. Myself, and probably many other photographists, would avail themselves of advertisers of this kind.—Yours obediently, G. Rousseau.

28, *Hanover Street, Peckham, S.E., May 30th*, 1866.

Developing Powders.

Sir,—In answer to the letter of "Experto Crede," which appeared in the News of the 1st inst., I beg to inform him, that, owing to some impure chemicals sent to me, I had, for about a week, a sample of powder which, after two or three days, became quite inert, producing a milky solution, and giving no picture whatever.

Had "Experto Crede" taken the trouble of writing to me (as some other gentlemen in the same difficulty did), I should immediately have sent him another sample, giving the results you so fairly described in the News of March the 20th.—I remain, sir, yours truly, Bona Fide.

28, *David Place, Jersey, June 5th*, 1866.

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Talk in the Studio.

Caution to Photographers.—It appears photographers are likely to become victims of a form of robbery scarcely to have been anticipated. Mr. England sends us the following: "On Thursday night, or Friday morning last, some thieves broke into my workshops, by taking out a pane of glass, and stole the contents of the cistern residues containing a quantity of chloride of silver, probably about 100 ounces. It was evidently done by some experts used to this mode of thieving, as they came prepared with bottles (one of which they left behind) to bottle off the chloride, which they had to collect after pouring some thirty gallons of water. They also removed several hundreds of prints from the washing tank, but, being probably disturbed during their operations, those they threw about the yard, instead of carying away in their flight. They left behind a bayonet and lamp, and the bottle before mentioned. Should those gentlemen meditate another visit, allow me to inform them that in future no valuables will be left on the premises; also, that I intend to furnish the person living in my house opposite with a *revolver*, knowing him to be a man who would use it if necessary. As printers sometimes collect large quantities of residues, and as those things are becoming known, I would advise them to keep as little as possible on the premises."

Printing on Canvas.—We recently saw some very well-painted enlargements on canvas by Mr. E. Sawyer, of Newcastle-on-Tyne, in the production of the original photographs of which Mr. Sawyer used the process of printing on canvas recently described in our colums by the "Photographer's Assistant." An enlarged negative was first produced, and then the picture printed on canvas outright, without development, the result being excellent. Mr. Sawyer, who, it appears, enlarges and colours in oil for the profession, finds this a more successful plan than working with the solar camera development, and the results, both as photographs and paintings, were very good indeed.

Novel Mode of Stippling.—An acquaintance of ours imagines he has discovered a new and easy mode of stippling opal or porcelain pictures. Pictures prepared according to his process have a novel appearance; they are, in fact, *granulated*, not stippled; and such as are not artists may easily be deceived by them into the belief that they are the productions of some great genius. Now, pay attention, we will describe the method of granulating an opal picture. The negative is placed in the printing frame, and in contact with the collodion film comes the prepared and sensitive porcelain plate in the usual manner. The slide or door being now closed, the artist scatters upon the face of the negative some finely pulverized plaster of Paris or chalk, and immediately afterwards blows it off again; but a sufficient quantity of the finest particles still adhere to the surface of the glass, and, being in some degree opaque, they impede the passage of light, and thus produce a granulation in the print beneath. The result is curious and not unpleasing; the picture very much resembles the copy of an engraving.—*Humphrey's Journal.*

New Solvents for Gold.—On the 26th of March M. Nickles presented to the Paris Academy of Sciences a note "On some New Solvents for Gold." The author has discovered that gold dissolves in the ethereal perchlorides and perbromides, which he described last year (see *Chemical News*, vol. xi. p. 254). As the gold dissolves in the manganic compounds, the green colour of these gradually disappears (proto compounds, which are insoluble in ether, being deposited), and a yellow or red solution of gold is left. The ether being evaporated from this solution, and the residue sufficiently heated, a coating of metallic gold is left about the bottom of the tube, which suggests a process for gilding glass. The gold is reduced from the ethereal solution by proto-sulphate of iron, and also by proto-chloride of tin, but purple of Cassius is not produced in the latter case. Many sesquichlorides and sesquibromides, the author states, also dissolve gold, those which are easily reduced answering best. The cause of the solution is obviously the instability of the per- and sesquichlorides and bromides, from which free chlorine and bromine are easily separated. The ethereal periodides also dissolve gold, forming an iodide of the metal, showing that nascent iodine is a solvent, although that metalloid in the ordinary state is without action on gold. Last, an ethereal solution of hydriodic acid will dissolve gold leaf, owing, of course, to the instability of the acid and the liberation of free iodine in the nascent state.—*Scientific American.*

To Correspondents.

J. Schofield.—We cannot account for all your mishaps with the gelatine and silver printing bath. We should, however, recommend you to get the gelatine into a state of solution before adding it to the silver bath, and it will not then shrivel up as you describe; you will, however, probably find some precipitate which you can leave at the bottom of the bottle. The silver solution may be safely heated, if necessary. The chief advantage of gelatine is not so much in improving the tone as in giving vigour with a weak silver solution. Your toning difficulties are probably due to the acid condition you describe of the gold. There is no danger of it having been injured by keeping. Add some powdered chalk to the toning solution, and let it stand a day or two. This will neutralize excess of acid without causing alkalinity. If you do not succeed, write again, and send one of the prints.

W. H.—As a general rule in photography, the more sensitive you contrive to make plates to the action of light, the more sensitive, under certain limits, they are to all other disturbing causes; and they are, therefore, more liable to spots, stains, and fogs. We have never met with a dry process as sensitive as the wet process. The extra sensitive plates of Dr. Hill Norris are the most sensitive dry plates we have tried, but we have found that they require double the exposure of wet collodion in good condition. A process was described, a year or two ago, by the Editor of a contemporary journal, and a series of negatives taken by it, with the same exposure as wet collodion, were described as perfect. A skilful amateur recently remarked to us, that he had availed himself of the opportunity of examining them, and found them so imperfect that he should not have considered them worth picking out of the streets. We do not mention these things to discourage you in your efforts to produce dry plates as sensitive and as perfect as wet, but to show you that if, in such a quest, you meet with troubles and disappointments, you are not worse off than those who do not confess the same failures. Absolute certainty as to good results does not, in any process yet discovered, appear compatible with a sensitiveness nearly equalling that of wet collodion. The best results obtained with the most ease and certainty combined, with any degree of rapidity, are those we recently described as by Mr. Gordon's process, which required three times the exposure of wet collodion. In the trial we recently described, this process was twice as sensitive as the tannin with alkaline development. The use of bromide alone in collodion, either preserved with tannin or albumen, appears to give great sensitiveness; but the general experience of skilled operators pronounces the process as beset with uncertainties; and we regret that we cannot point out a method of removing the difficulties. We have not found that the re-crystallized silver to which you refer was in any way superior to or different from the ordinary crystallized nitrate of silver of commerce. We have used lithium salts in collodion with advantage, both in wet and dry processes. We should not recommend it without any cadmium, as the collodion is apt to lose sensitiveness rapidly when it is used alone. Immersing a plate too soon will often cause the streaks you mention.

Tyro.—The defect of which you complain is mealiness, and may proceed from a variety of causes, of which, however, the most probable is the condition of the toning bath. A phosphate bath generally becomes inert on keeping, and when you add sufficient of a fresh solution of chloride of gold to set up toning action, it will, if you use it at once, have much of the defect of a newly mixed bath. For keeping purposes, an acetate bath or a lime bath answers best. A lime bath containing one grain of chloride of lime, one grain of carbonate of lime, and one grain of chloride of gold, made with hot water, and used any time after it has stood six hours, will rarely give mealiness. 2. Practically, we prefer a neutral bath, decidedly not alkaline. The addition of a trace of fresh gold to an inert bath will generally answer, but if much be added, and it be used at once, mealiness will ensue. 3. The water mark you mention is that of the maker of the paper, and the same may be found on the samples prepared by many albumenizers.

Marsh Photographer.—Liver of sulphur will answer your purpose best, which will throw down the silver as a black sulphide. You can then either sell this or reduce it yourself. The prints enclosed are very good.

Ignoramus.—The triple portrait lens is especially intended for portraits and groups, for which it is admirable, and gives amazing depth of focus. How far it will answer for views as well we cannot say, as we have not seen it tried yet for that purpose. In producing an inch head with the lens you mention, the only way to secure perfect definition of nose, ears, hair, &c., is to use a small stop. It is made for card pictures, and for working, therefore, at a much greater distance from the figure; and the nearer you have to approach the sitter the less depth of focus you will have. The new triple would be much better for such heads.

Jas. Sanders.—You can procure the persulphate of uranium of Messrs. Hopkin and Williams, New Cavendish Street, W.

R. W. J.—We presume, from the diagram, that the studio will be merely sufficient as a shelter for the sitter, and that the camera will be placed outside. We fear that without some supplementary system of curtains you will find the front light from the open space C D will be troublesome.

J. B. S.—Where you have reason to expect that direct sunlight will enter during operating, it will be well to have the roof of corrugated glass, which will diffuse direct rays, but will not admit as much light when the sun is not shining as plain glass. Considering the space of light you have admitted, it is very probable that corrugated glass might be used for the whole of the roof with advantage.

W. Wilson.—We regret that you also should have been disappointed with the addition to developing solution sent to you. It is manifestly not the same as that sent to us. It is evident that the powder has undergone some decomposition, as, otherwise, it is evident that it would be to the interest of the maker to send out a useful article. We have not heard yet from Mr. De la Tour.

Amateur and Subscriber.—We will communicate with Sir John Herschel on the subject.

R. P. L.—The loss of half-tone and the presence of a yellow tint in the whites generally indicate the action of sulphur. It is the change of the delicate half-tones into a yellow sulphide of silver which makes the half-tones become invisible, and suggest the notion that they have really been removed. Alum in the paper might decompose hypo, and liberate sulphur. The best remedy would be to avoid the paper which gives you those results; or, if you continue its use, take care to use the hypo strong, and keep it alkaline, and if the prints are left soaking all night a trace of alkali in the water might be useful. Do not use an alkali until you have thoroughly removed the gallic acid solution.

W. M.—It is probable that the collodio-chloride of silver process would answer your purpose for working on a zinc plate.

Ignoramus 2.—In making the imitation of green tea with bichromate of ammonia, we have generally placed a small crystal at the bottom of a test-tube, and applied the flame of a spirit-lamp, which decomposes the bichromate, leaving green oxide of chromium in the form of a multitude of shrivelled-up leaves like green tea, having considerable bulk. Placing the bichromate on a piece of tin, and applying the flame of a spirit-lamp underneath, will answer.

Quisnish.—We have never seen negatives produced in the ordinary way which were green. Are you sure that it is not the reaction of cyanide and iron you are complaining of, which gives a blue colour, sometimes approaching green? If the iron developer was not thoroughly washed away before applying cyanide, this colouration would be produced. Addressing the gentleman you name at Manchester, will find him.

J. Hine.—The correct distance between the lenses of a combination depends on the focus of each, and other matters. They are generally placed in their right position by the optician, and they cannot be moved without injury. Placing them closer together will increase the field of illumination, but will probably injure the definition. A lens of the focus you mention probably will not cover a card properly without a small stop. The remedy is the use of a lens of longer focus, as placing the lenses closer together will not make the combination cover better. 2. To put your portrait combination correctly together again, place the double convex lens in the cell, resting on its least convex side; then put in the ring, and then the concavo-convex, its concave side next the ring. Thus, when the whole is screwed together, the double convex forms the back lens of the combination, the concavo-convex being innermost. 3. The object of using a solution of iodine before intensifying is to prevent fog, which it does effectually. If applied after fixing, and suffered to remain long, the application of hypo will, of course, reduce the image by dissolving the iodide of silver formed. Unless you wished to reduce the image, why did you subject a negative to such treatment? In all processes it is most important to wash out every trace of hypo before applying another solution.

Veritas.—We have never seen a definite formula, nor ever made one, for producing the magic photographs. Take an ounce of bichloride of mercury and an ounce of chloride of ammonium, and dissolve in 10 or 12 ounces of hot water. Submit the prints to this until they are bleached. The hypo solution of the strength used for fixing will serve.

H. G. Rogerson.—Mr. Gordon's mode of proceeding is to mix an ounce of the preservative at a time, which is sufficient for two plates. Having all the materials and measuring glasses standing ready, he finds it quite easy to mix fresh as he requires it, and so run no risk of the reaction between silver, ammonia, and albumen being completed in the measuring glass, which he wishes to take place in the film. The ammonia and silver solution are each transferred into the glass by a small pipette, with india-rubber top, kept for its own purpose.

J. J. Barnwell (Detroit).—We fear that Le Gray's work of 1850, published by Willatt, is out of print. We recently procured the loan of one to forward it to Mr. Carbutt, of Chicago. Probably, if the photographers of Chicago establish the publication, in this country, of the use of bromides in collodion prior to the Cutting patent, it will serve your purpose. There is abundant evidence in this country of its familiar use long before the application for a patent in the States. We will comply with your former request if we can get unmounted copies.

Subscriber.—In order to obtain paper of unusually large size, albumenized, for direct printing, you will have to order it specially. Any of the manufacturers of albumenized paper will prepare it for you. Marlon & Co., we believe, keep albumenized paper in rolls of 12 feet long.

Constant Reader.—For warm tones, we prefer the acetate bath; for black tones, the lime bath. Either of these, made according to the formula given in our Year-Book, and kept a few days before use, will give good results. Mealiness generally arises from using the toning bath too soon after it is mixed.

W. St. John, Ten Years a Photographer, and others, in our next.

Photographs Registered.

Mr. J. Pender, Waterford,
    Photograph of Rev. Dr. Hyms.
Messrs. W. and D. Downey, Newcastle-on-Tyne,
    Two Photographs of Rev. R. Chew.
Mr. Jackson H. Walk, Rochdale,
    Two Views of Birthplace of J. Bright, M.P.
    Two Views of Residence of J. Bright, M.P

THE PHOTOGRAPHIC NEWS.

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FADING OF ALBUMEMIZED PRINTS, ELIMINATION OF SILVER, ETC.

We have to bring before photographers another aid to permanency, which has, within the last few days, been brought under our attention by Mr. Spiller. Perhaps the most abiding photographic care which rests on the mind of every one of our readers, professional or amateur, is that arising from misgivings as to the permanency of his pictures. Hence everything which tends to extend their tenure of stability is listened to with eager interest. The recent proposition of Dr. Angus Smith, to employ peroxide of hydrogen for the elimination of the final traces of hyposulphites from prints, is one of the suggestions which, possessing undoubted value, and coming from a high source, is seized with laudable avidity, and will, if found as efficient as some anticipate, be generally adopted by conscientious photographers.

In order, however, to avoid the formation of exaggerated hopes, or the indulgence of unfounded notions of security, it may be well to enquire to what extent the elimination of hyposulphites from prints will increase their permanency, and, before referring to Mr. Spiller's suggestion, again to glance at the causes of fading.

The familiar impression on the minds of many photographers is, that fading is due, in some way, to the action of the hyposulphite, and that its imperfect removal from the print is the chief cause of the evil. This is, however, by no means the only source of fading, nor, in our conviction, by any means the most prevalent. The chief sources of fading inherent in the constitution of albumenized silver prints appear to be four in number; they are :—

1st. The formation of sulphide of silver whilst the print is in the fixing bath.

2nd. Imperfect fixation.

3rd. Imperfect washing.

4th. The existence of a compound of albumen and silver in the whites of the print, which is not removed by the fixing bath.

First.—By far the most common cause of fading is, we believe, *the formation of a minute portion of sulphide of silver in the process of fixing*; or, in other words, a slight amount of sulphur toning. Any acid left in the print during toning will readily bring about the decomposition of the hyposulphite, by which this will be effected; the action of light and heat upon a bath, in any degree approaching saturation with hyposulphite of silver, and some other causes, will also effect a similar end, in which the hyposulphite is decomposed, throwing down sulphur, and leaving sulphurous acid in solution, the result on the print being the formation of sulphide of silver. The tendency to this decomposition is so great, that nothing but the most watchful and zealous attention will serve to prevent it. The fact that, when this takes place in slight degree, the print, when fixed, does not appear to have suffered, but rather to have gained in beauty, having a richer and intenser black or purple tone, leads the photographer to suspect no evil. This black sulphide of silver, which communicates the additional depth, has been shown by Messrs. Davanne and Girard to have a strong tendency to pass into the yellow sulphide of silver, communicating to the blacks of the print a disagreeable olive green tint, and to the whites and delicate half-tones the unpleasant cheesy hue so well known in faded prints. When once formed, there is no method, that we know of, which will restore the print. The means of preventing the formation of sulphide of silver during fixing consist in thorough washing of the print before fixing, using the hypo solution fresh and strong, shielding it from the action of light and heat, and in the addition of an alkali, to which we shall presently advert.

Second.—*Imperfect Fixation* is a source less of fading than of the formation of yellow spots, made apparent very soon after the finishing of the print. If the hyposulphite solution be weak or exhausted; if, with the ordinary strength, the temperature be very low; if the prints are stuck together; only partially immersed; not kept moving; too soon removed; or if air-bubbles form and protect small portions of the surface, imperfect fixation is apt to result. To fix the print properly, there must be sufficient hyposulphite present to convert all the chloride of silver into hyposulphite of silver, and to furnish two equivalents of hyposulphite of soda besides, to form the soluble double salt. If only sufficient hyposulphite of soda were present to convert the silver salt into hyposulphite of silver, it would decompose almost immediately, and pass into sulphide of silver. Theoretically, three equivalents of hyposulphite of soda are sufficient to form the soluble double salt, necessary in perfect fixation, with one equivalent of chloride of silver; but it would scarcely be safe in practice to work to this standard. It is difficult to state, with any definiteness, the proportion of hyposulphite of soda which should be used for fixing a given number of prints, inasmuch as the quantity of chloride of silver present varies with the proportion of salt used in the preparation of the paper. It has been assumed that one ounce of hyposulphite of soda dissolved in five ounces of water would fix about three sheets of paper; but in practice it would be wiser never to exceed two sheets of paper with that quantity, observing all other proper precautions as to perfect immersion, &c. Imperfectly fixed prints, however, generally show spots or stains arising from the decomposition of the hyposulphite of silver, either in the washing water or shortly after they are mounted; and these defects ought not to be regarded as constituting fading.

Third.—*Imperfect Washing* will of course prove a source of fading. When a print is not perfectly washed after fixing, it contains traces of the double hyposulphite of soda and silver, and of excess of hyposulphite of soda, and these, remaining in the print in contact with silver, are constantly liable to decomposition, from which sulphide of silver would result. It is here that the modes of eliminating the hyposulphites, recently proposed, by converting them into sulphates, become available. Dr. Angus Smith proposes to submit the washed print to dilute peroxide of hydrogen, which readily gives up its excess of oxygen to the hyposulphites, and changes them into sulphates, which are less liable to decomposition. Mr. Hart proposed, a couple of years ago, to effect the same change by other and cheaper means. So far as we see at present, there is no reason why the use of chlorine water or hypochlorite of soda should not answer well. This result, so far as it goes, is a good one, as it undoubtedly removes one of the sources of fading; but it does not remove all. It leaves sulphate of silver in minute quantity still in the print, and it will not remedy cases of imperfect fixation or sulphuretting in previous stages of the work.

Fourth.—The most persistent source of fading in albumenized prints has been the formation of an insoluble compound of silver and albumen which remained in the whites of the print unremoved by the fixing salt. However perfectly all the operations were performed, this defect remained. If the print were perfectly fixed, and no traces of sulphide of silver were formed in the process, and if the washing was of the most perfect kind, a very fair tenure of permanency, indeed, might be anticipated for the print; and well preserved photographs may be pointed out, which have changed little, if at all, in ten or a dozen years. We have photographs in our possession which we printed over a dozen years ago, which are apparently unchanged; but we have others, done since, with no less care, which have changed. So long as this compound of silver with albumen, a substance containing sulphur, exists unremoved, it is liable to a decomposition, which will set up the fading action, which consists in the whites being degraded by turning yellow, and the blacks losing force by turning yellow. To Mr. Spiller is due the discovery of this existence of silver in the whites of the albumenized prints, and to him photographers are indebted for the only systematic attempts to find a solvent for the compound. His former attempts will be found duly recorded in our pages.

We are happy to announce that his recent efforts have met with higher promise of success than he has hitherto attained. At the last meeting of the North London Photographic Association, Mr. Spiller read a paper the whole of which we commend to the careful consideration of our readers. But it is especially to this branch of his subject we now call attention. He exhibited portions of a fixed print treated with peroxide of hydrogen, the whites of which were then brought into contact with sulphide of ammonium. This substance practically anticipated the decomposition which time, and other agents to which the print might be submitted, could bring about, and a marked brownish yellow patch of sulphide of silver was the result, showing that the print was by no means removed from the risk of fading. He also showed a portion of the same print, which, after fixation, had been submitted to a second bath of hyposulphite of soda and carbonate of ammonia, and then treated with sulphide of ammonium. In this case the amount of silver present was perceptibly smaller, and the discolouration produced much slighter, a slight yellowness, not deeper than the tint on India paper, being the result.

Since then we learn that Mr. Spiller has carried his experiments further with very marked success. He finds that, on adding one pint of a cold saturated solution of carbonate of ammonia to each pound of hyposulphite used in the fixing solution, and immersing the prints for the usual time, almost all the silver is removed from the whites of the picture, a very slight discolouration indeed being apparent on the application of sulphide of ammonium. This is not the only advantage gained. When carbonate of ammonia is added to the fixing bath, the risk is materially decreased, if not entirely removed, of the decomposition arising to which we have referred, by which sulphur toning is set up, and thus two of the chief sources of fading are largely removed by the operation.

Mr. Spiller is still pursuing the experiments. The *minimum* proportion of carbonate of ammonia which will effect the purpose remains to be ascertained. A quarter of a pint of saturated solution to a pound of hypo did not answer so well as a pint of the same solution, but a pint and a half did the work no more effectually than a pint. It is probable, Mr. Spiller thinks, that about half a pint of the saturated solution to a pound of hyposulphite of soda may answer the purpose. A saturated solution of carbonate of ammonia contains about thirty per cent. of the salt, and its price is, we believe, about double that of hyposulphite of soda.* It will be seen, therefore, that the increased cost of this additional security against fading would be equivalent, stating it in round numbers, to something like an increase of three halfpence on each pound of hyposulphite of soda used.

One word in conclusion. It has sometimes been argued that, in a finished print treated in the ordinary manner, the traces of unreduced silver of any kind left in a print must be so infinitesimally small that little injury can result from its decomposition. Let it be remembered, however, that the photographer has to consider rather potency than quantity. A very minute trace of sulphide of silver is sufficient to destroy the beauty and affect the permanency of a print. Nothing can, perhaps, secure absolute stability in a picture formed of a thin layer of a metal having such an affinity for sulphur as silver, especially in the atmosphere of cities, in which sulphurous gases are common. But it is worth while, so long as silver printing is practised, to use every appliance for removing the sources of fading from the print itself. Mr. Spiller's suggestions will materially affect this in one direction, as will also that of Dr. Smith, or of Mr. Hart—whichever may be found efficient in practice—in another; and until carbon supersedes silver, which it is probable it shortly will, no aid to permanency should be neglected.

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THE EXHIBITION SOIREE OF THE PHOTOGRAPHIC SOCIETY.

On the evening of Thursday, June 7th, a soirée was held, in connection with the Photographic Society, in the large hall, King's College, at which an unusually large and brilliant assembly of visitors was present. Two of the vice-presidents, Mr. Glaisher and Dr. Wright, did the honours of reception as the guests arrived. The president of the Society, the Lord Chief Baron Pollock, accompanied by Baron Bramwell, both in their judicial robes, was also present during the evening. Amongst the visitors were many gentlemen highly distinguished in science, art, and literature.

As the unremunerative character of photographic exhibitions, during late years, seems to preclude the continuance of such annual displays, it was thought desirable to render this occasion available as a means of bringing together anything new and noteworthy in connection with the art, and it was announced that it would be an exhibition soirée, and an appeal was made to all who had results worth showing to send them on this occasion. We regret that this invitation appeared to have been less freely accepted than was desirable, for, notwithstanding that a display of very good pictures was made, it was not such a satisfactory representation of the progress and present position of the art as

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* *Carbonate of ammonia* is well known to have a variable composition, commonly supposed to be a sesqui-carbonate with water—

$$2\,NH_4O,\ 3\,CO_2 + 3\,Aq;$$

but when sublimed, the first and last products are never identical, so that the commercial salt will present variable degrees of solubility; these will, however, lie between the limits of 30 parts in 100 of water at 60° F. (Berzelius), and 33 parts (Ure). Exposed to air, it becomer changed to bicarbonate, and falls to a dry white powder. It costs eightpence per pound.

we should have liked to have seen on such an occasion. The chief exhibitors were old members of the Society, many of whom sent in large contributions of well-known pictures, chiefly with the view of filling space which would otherwise have been bare. This circumstance, however, was not matter for regret, for they were, in almost every instance, pictures which well repaid a renewed examination of their beauties.

Perhaps most striking amongst the novelties, and certainly amongst the contributions exciting most attention, were the pictures of Mrs. Cameron, many of which were nearly life-sized heads, which were stated to have been taken direct, without enlargement. We have frequently expressed our conviction that, in many respects, the labours of this lady were in the wrong direction; that the production of a rough, hasty, suggestive sketch, with details imperfectly made out, was at times admissible and admirable in painting, because it embodied a fine thought which might have been lost in more coldly laboured and more highly finished work; but that, as in photography less time or effort was required for producing the most marvellous details than for their studious omission in the picture, the reasons which justify the painter's rough sketch have no bearing on the productions of the camera. We have always, however, felt pleasure in doing justice to the artistic feeling which distinguished many of the pictures, and in regard to many of those exhibited on Thursday evening, we cannot praise this quality too highly. Some of the large heads, in which the definition was quite sufficiently precise for the subjects, were exceedingly charming, and possessed artistic qualities rarely seen in photographs. Of those which pleased us best we may especially mention the beautiful head of a little boy, simply distinguished as No. 6, which was perfect in drawing and modelling, admirable in expression, grand in massing of light and shade, and sunny and transparent in a rare degree. Some profile heads were also very fine, and free from the blurred contours and smudgy gradations we have before condemned. It is a somewhat dangerous thing, however, to suggest comparisons, and when we find a female head, turned over the shoulder, with white turban head-dress, described as "Beatrice," the mind involuntarily reverts to the touching beauty of a face, with eyes in which a strangely wistful look of tenderness and sorrow are blended, which is known as Guido's portrait of Beatrice Cenci. And the photograph of a pleasing face, with nothing of the rare beauty, and still less of the wondrous expression, in the historical portrait, will not satisfactorily bear the comparison.

Another series of art compositions attracted much attention, and won universal admiration, the technical photographic qualities in nothing falling short of the artistic conception manifested. These were a series of groups and single figures on plates 16 by 12, by Mr. H. P. Robinson, described especially as illustrating the qualities of Mr. Dallmeyer's new triple lens for portraits and groups. In these pictures Mr. Robinson has adhered to his custom of rendering characteristic rustic life, avoiding masquerading or stage effects. As pictures in which a thought is embodied, the action and expression and whole character of the figure and every detail of the scenery and accessories carrying out that thought, they leave nothing to be desired. As photographs, in which every technical detail is perfect, and in which an amount of definition, distributed over a variety of planes without loss in any, we have never seen them equalled. As we shall have future occasion to refer to these pictures, we shall not enter into further detail here.

There was a large display of excellent portraiture, for which we have not, however, space for extended notice. Mr. Claudet exhibited a number of exceedingly perfect examples, especially distinguished for artistic feeling, amongst which a portrait of Mr. Peabody excited considerable attention. Mr. Mayall's enlargements, especially the series of Tennyson, in every size, left nothing to be desired, as nothing of the kind finer could probably be produced. Some very highly finished enlargements in oil evidently excited the largest share of popular admiration. Mr. Fry exhibited some very fine examples of enlargement in which an amplified negative is employed; and Mr. H. C. Heath some fine enlargements by the solar camera. A very fine enlargement to life size of the Chinese giant, Chang, which excited much interest, was exhibited by the Stereoscopic Company.

Messrs. Moira and Haigh had a very fine display of portraits of various kinds, amongst which, especially worthy of notice, were some miniatures on opal glass, highly and charmingly finished in water colours. Messrs. Lock and Whitfield, Mr. A. T. Heath, Mr. Hubbard, Mr. Hooper, and some others, also exhibited fine examples of portraiture. The casket portraits of Mr. Henry Swan, in which an exquisitely delicate and perfect stereoscopic portrait is mounted in a small crystal cube, were much admired.

Mr. Hughes exhibited a number of fine large instantaneous pictures of yachts, frigates, &c., which received much attention. Mr. Buxton's Indian photographs, especially one of the Botanical Gardens at Calcutta, were marvellously perfect. Mr. Moens exhibited some of the photographs obtained during his visit to Italy which terminated in an enforced participation in the hospitality of the brigands for a few months. Many of these photographs possessed especial interest, as depicting Etna immediately after a fresh eruption, the camera-stand requiring to be moved from time to time, to escape the flow of the burning lava. There was an excellent display of Mr. England's admirable Swiss views, and also of the charming landscapes of Mr. Bedford. Mr. Henry White sent a number of the pictures which added a grace to exhibitions six or eight years ago, and which lost nothing by comparison with more modern pictures. Mr. Bambridge sent some capital photographs of animals. Messrs. Marion contributed several volumes of fine reproductions from paintings. Mr. Ross sent some specimens of the work of his lenses. Mr. Frank Goode, Mr. Dunmore, Mr. Durrant, Mr. Heisch, Mr. Rouch, Mr. Ritchie, Mr. W. W. King, Dr. Wallich, and other contributors, all aided in enriching the display of pictures.

There was not much display of apparatus of any kind, Mr. Solomon being the chief contributor in this department. His arrangement for the application of the magnesium light to the magic lantern was highly interesting. The light was brilliant and satisfactory, and the smoke quite avoided; some of Mr. Frank Haes' admirable transparencies of the animals in the Zoological Gardens being thrown on the screen and shown with much perfection, to the gratification of many of the visitors.

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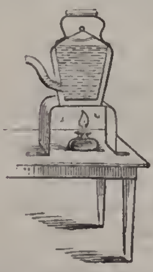
PRACTICAL HINTS FOR THE STUDIO.

BY A PRACTICAL MAN.



The Jacket Kettle.—As the carbon and other processes requiring hot and warm water will soon be in operation, the vessel introduced in the cut will be found an improvement on the general culinary one, the "dodge" consisting in enclosing it with an outer casing or jacket, leaving the bottom open for the flame of a spirit-lamp to act upon it. When heat is applied to a vessel so constructed, the plate of air between the cases acquires such a temperature in the upper part as to be capable of melting a rod of glass if passed up the cavity. In the common kettle in general use, a great part of the heated air escapes without producing any useful effect; this is proved by water, &c., being sooner boiled in the Jacket Kettle than in the ordinary one, giving economy in time as well as fuel, and will be found a cheap, simple, and handy addition to any studio.

In the cut, the kettle is placed on a piece of bent sheet-iron, and the lamp in the cavity underneath.

THE EFFECT OF COLLODION ON THE NERVOUS SYSTEM.

BY J. W. GATEHOUSE.

As many photographers besides Mr. H. Williams are undoubtedly unaware of the poisonous nature of some of the chemicals they constantly use, and even *breathe*, a few words on the subject may not be misplaced.

Cyanide of potassium, containing as it does more than one-third its weight of prussic acid, has a deservedly bad character, and is therefore usually used with some degree of caution; but when a photographer takes up his collodion bottle, containing, say, some three or four ounces, he does not often think that he has, bottled up in his hand—and that, too, in the state of a most subtle vapour—sufficient poison to kill half-a-dozen persons, or at least to render them insensible in the course of thirty minutes.

The vapour of both alcohol and ether is highly dangerous, the latter more so than the former, as it is the more volatile, and acts on the brain and nervous system like a powerful narcotic, producing a kind of intoxication with sleepiness, and on further inspiration, insensibility and even death. Before the discovery of chloroform, ether was used in surgical operations to deprive the patient of all sense of feeling, so we see its effect on the nervous system has been known to medical men for a very long time.

Although these effects are only produced in their highest degree when the vapour is breathed undiluted, yet its constant inspiration, even when mixed with a considerable proportion of air, must tend to a general depression of the nervous system, and in cases where there is any predisposition to disease of the brain or spinal cord, or to local paralysis, it would undoubtedly hasten the symptoms and increase the danger.

Any one who wishes to see this effect of ether on a small scale may easily do so by dropping a little collodion on a piece of blotting paper, and enclosing it, with a moth or butterfly, in a small case. The little insect first flutters its wings, but very soon ceasing to do so, it lies in a state of complete insensibility, from which, however, it often recovers.

In the present state of photography, the only remedy I can suggest, is to keep the dark room well ventilated, and, wherever possible, never to coat the plate inside it, as by this means you avoid, at least, being shut up in a poisonous atmosphere for the greater portion of the day.

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PHOTOGRAPHY IN ITS CHEMICAL ASPECTS.

BY JOHN SPILLER, F.C.S.[*]

It will be my object to lay before the members of the Society a few suggestions of a scientific character, which seem to open up fresh ground for experimental investigation, and which, when applied to the practice of photography, appear likely to contribute materially to the resources of the art. These considerations, while embracing a wider field of enquiry, refer immediately to the following points:—

1st. In what form can the precious metals, gold and silver, be most advantageously employed?

2nd. Should reducing agents be used separately, or conjointly, for the purpose of developing the latent image?

3rd. Can the solvent action of hyposulphite of soda, and other fixing agents, be improved by association with other substances?

After submitting a few practical conclusions already arrived at, I am desirous of appending some remarks upon matters which do not arrange themselves under either of the foregoing heads; such as the degree of permanence to be expected from albumen, collodion, india-rubber, and other photographic media. Many points of great interest must, however, be treated of somewhat concisely, since the limited opportunities of the past fortnight have proved altogether insufficient to enable me to confirm, by repeated experiments, several of my earlier photo-chemical results.

With regard to the application of gold in the toning processes, we are now in the habit of employing this metal in the form of auric oxide, associated with an alkaline carbonate or acetate. Neutral chloride of gold is a practical impossibility, and the ordinary crystals contain an atom of $H\,Cl$ in combination with the auric terchloride. The hydrogen in this compound may, as is well known, be replaced by potassium or sodium, true double salts being thus formed; but their use cannot be attended with any advantage, since the ultimate products in an alkaline gold bath must be identical.

The *sel d'or* of MM. Fordos and Gélis has become obsolete since the toning and fixing processes have been separated.

Of all the compounds of silver, the nitrate is the only salt the use of which has been universally recognised; but the advantages attending its application in the collodion process seem open to question, since Dr. W. A. Miller published his researches "On the Photographic Transparency or Diactinic Power of Different Media." In a tabulated statement accompanying the author's paper in the *Philosophical Transactions*, 1863, the nitrates are ranked lowest in the scale, whilst the fluorides are conspicuous at the head of the column for their relatively great—indeed, in some cases, absolute—transparency to the chemical rays. Fluor spar, rock crystal, ice, and water, appear at the head of the series as being perfectly diactinic, whilst common saltpetre absorbs a very large proportion of the active rays. The nitrate and chlorate of potash are in this respect remarkably dissimilar, the chlorates as a class being very transparent. Dr. Miller says:—

"Among the various compounds submitted to examination, the fluorides were found to be chemically the most transparent; then follow the chlorides of the alkali metals; the bromides are less diactinic, and the iodides show a striking diminution in this respect. The group most remarkable for its absorptive power is that of the nitrates. Nitric acid, whether simply dissolved in water, or combined with bases, has a specific power in arresting the chemical rays; the less refrangible portion it transmits freely, but intercepts the spectrum abruptly at the same points, whatever salt be employed, provided the base be diactinic."

It thus becomes interesting to examine the claims of the fluoride of silver, a very soluble and deliquescent salt, with a view to the possibility of employing it, instead of the nitrate, for the purpose of sensitizing the collodion plate. More than ten years ago, Mr. Crookes and myself prepared and used this salt with good success, and we were then hopeful of employing it as a means of preserving a moist film, but it was found to have the property of dissolving off the coating of iodide of silver when, by partial evaporation, the liquid became sufficiently concentrated. Plates excited in the bath of fluoride or silico-fluoride of silver were, however, in no way inferior to, and should have been more sensitive than, others prepared with the nitrate of silver. In repeating these experiments during the present year, I am still bound to admit the force of the following objection.[*]

"The difficulty experienced in the preparation of the fluoride in a neutral condition,—any excess of hydrofluoric acid being objectionable on account of its property of etching the glass; and, on the other hand, the slightest alkaline reaction rendering it extremely difficult to obtain clear pictures on development,—deterred us from pursuing the subject further in this direction."

Fluoride of silver is best prepared by dissolving the precipitated oxide or carbonate of silver in diluted hydrofluoric acid, using vessels either of silver or platinum. It is not possible to obtain it from the nitrate or chloride by evaporation with hydrofluoric acid, and I find that commercial samples of this acid are liable to be contaminated with sulphurous and sulphuric acids, so that altogether the preparation of the fluoride of silver continues to be a costly and difficult operation.

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[*] Read before the North London Photographic Society, June 6th.

[*] Vide *Journal of the Photographic Society*, May, 1856.

Silico-fluoride of silver appears more deserving of study, and I anticipate good results from a renewed investigation which I purpose undertaking. The silicium already contained in this compound may be expected to guarantee the safety of the lenses and other glass surfaces.

There is another class of silver compounds never yet alluded to (so far as I am aware) by photographic authorities, but which I have lately been making the subject of experiment. These are the superphosphate and others of the same type. For their preparation, it is necessary first to produce the precipitated phosphate of silver, and to dissolve this in aqueous phosphoric acid, whereby a solution is obtained containing the requisite amount of the precious metal to enable it to be used in the formation of a sensitive film. In like manner arsenic acid dissolves the arseniate of silver; but Dr. Miller's results, irrespective of many other pressing considerations, forbid the use of arsenic when solutions of superior photographic transparency are the objects of search. There are some anomalies connected with the superphosphate of silver which will require a careful study before these soluble combinations can be made available; particularly I noticed a tendency for white crystals (of meta-phosphate of silver?) to appear suddenly in solutions recently filtered.

With respect to the acetate of silver, it is worthy of note that the degree of solubility in cold water exactly fits it for use in the re-developing process, and I have successfully employed the saturated aqueous solution in admixture with pyrogallic and citric acids for intensifying collodion negatives. The sulphate of silver is inferior to the acetate in solubility, only two grains dissolving in an ounce of cold water, but might, perhaps, under special circumstances, be made available. The chlorate and hypochlorite of silver are both very soluble salts, deserving investigation, but they are not easily prepared.

The physical condition of the metallic silver, which forms the opaque deposit in the collodion film of a developed negative, is known to be greatly influenced by the quality of the deoxidising agent employed to effect its reduction; pyrogallic acid always gives a more pulverulent, amorphous, and darker-coloured image than that furnished by the proto-salts of iron. This result is accounted for by the greater activity of the first-named developing agent, and substances of this class may be arranged in series, according to their affinities for oxygen, thus:—

Pyrogallic acid.
Sulphate of iron.
Formic acid.—Aldehyde.
Gallic acid.—Glucose.

But with the same reducing agent, I notice that the molecular condition and colour of the deposit are influenced by the state of combination of the silver, and the acetate appears to give up its metal more readily than the nitrate; hence it furnishes a metallic film of a darker tint. Again, the presence of citric acid in the pyrogallic re-developing solution brightens the colour of the silver by retarding its deposition, and rendering it somewhat crystalline; and the effect of nitric acid in small quantity is even more marked.

In connexion with this part of the enquiry it is important to notice the effects of employing two or more reducing agents in association. In the early days of photography, Mr. Robert Hunt suggested the use of iron salts in admixture with pyrogallic acid, and, to overcome the dark colour of such a combination, a trace of free nitric acid was added. Mr. H. P. Robinson, in 1857, used a mixture of gallic and pyrogallic acids, in the proportion of four to one, as a developing solution, in his manipulation of the collodio-albumen process. Formic acid was employed in combination with pyrogallic acid by Mr. Fetherston; and many amateurs, besides Mr. Maxwell Lyte and Mr. Rodger, have recommended the addition of formic acid to the iron developer. Dr. Barker suggested the employment of the dark-coloured solution obtained by passing nitric oxide gas through aqueous sulphate of iron; and very recently M. Meynier, of Marseilles, has proposed the use of glucose in combination with the same salt of iron.

These several recommendations may be accepted as proof of the necessity for occasionally modifying the reducing actions of pyrogallic acid and proto-sulphate of iron; but, on the other hand, it must not be forgotten that by varying the state of dilution, by the addition of free acids and of mucilagenous or other extraneous substances, any desired degree of chemical activity may be imparted to the developing agent. It is not greater energy that is now an object of search, but rather the means of controlling the excessively powerful agencies at our command, so that the formation of the image may proceed gradually and regularly until the desired depth of intensity is secured, and all the intermediate shades are presented in the photograph as nearly as possible in accordance with nature. There may be considerations which render necessary a departure from this course, and it cannot be doubted that the calotype, albumen, and collodion processes will each require a developing agent suited to the particular qualities of the several media therein employed; and we have made a great advance in the collodion process by adopting the now common practice of applying first the iron salt, as a comparatively slow developing agent, and, when the details of the image have appeared, resorting to the use of a more powerful reducing substance—pyrogallic acid—for intensifying the already formed image. It is surely more correct, both in theory and practice, to employ these two reducing agents in succession, rather than apply at once to the plate a mixture of pyrogallic acid and sulphate of iron. If it be ruled that there is a positive advantage in employing two or more reducing agents in association, then among the selection already enumerated we might expect the greatest benefit from the use of formic acid in conjunction with the proto-salts of iron; for it should take the place of acetic acid in preventing the deposition of basic ferric compounds, and, at the same time, exert a reducing action on its own behalf. The cost of formic acid is no longer a bar to its employment in photography since M. Lorin* has recently communicated to the French Academy the details of a mode of preparation from oxalic acid by heating in a bath of glycerine, a process which seems to furnish so large a product that formic acid may in future be expected to appear in commerce nearly on a par with acetic acid. Cane sugar and the sulphates of ammonia and copper have each been used for the purpose of protecting, in some measure, the iron salt from atmospheric oxidation, and the last-named compound tends also to diminish the power of the protoxide of iron, since an intermediate change—that of the formation of suboxide of copper—probably occurs.

Among the processes in ordinary use for intensifying negatives, there is one depending upon the application of an acid solution of chloride of mercury, followed by treatment with an alkaline sulphide. These chemical substances have always appeared to me to be ill chosen, since they attack both constituents of the film, the silver becoming amalgamated and fragile, and the texture of the pyroxyline injured by becoming partially reduced, either to an inferior nitro-compound, or, further, to the state of cellulose. Such negatives must depend, for their preservation, almost solely upon the varnish, and cannot be expected to yield so many prints as those having originally a strong film.

With reference to the third point proposed for discussion, viz., the possibility of increasing the solvent action of hyposulphite of soda, I have only as yet one or two meagre facts to offer. During the past four years my efforts have at various times been directed to the removal of the whole of the silver from the unexposed parts of albumenized prints; many solvents have been tried, particularly the alkaline tartrates, citrates, chlorides, iodides, and ferrocyanides, but none have been found to answer. Lately I have put to the test of experiment the new ruby-coloured salt which Mr. Hadow has introduced to the notice of chemical manufacturers; I mean the nitro-prusside of sodium; but it likewise failed in proving of any service. A large proportion of the silver is, however, extracted from the albumenized coating of an ordinary finished print, by treatment with fresh hyposulphite of soda mixed with ammonia or carbonate of ammonia; and this observation led me to examine the action of alkalies upon the double hyposulphites, and particularly upon the mixed solutions, resulting from the employment of the soda salt in photography. Ammonia produces no change, but if caustic potash be liberally added to such liquid, a white crystalline precipitate is thrown down, which appears to be the double hyposulphite of silver and soda; but if the alkali, or even the carbonate of soda, be added in small quantity, it does not practically diminish the solvent power of the hyposulphite, whilst it tends to prevent the decomposition of the double salt in question, both against the influences of heat and time. The exact determination of the saturating point of the hyposulphites is attended with difficulty, on account of the decomposable nature of the product; but there is little doubt that the addition of carbonate of ammonia in small quantity to the fixing bath will serve a useful end: firstly, by aiding the hyposulphite in the more perfect removal of the silver; and, secondly, by rendering more permanent the double soda and silver salt so formed.

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* *Vide Chemical News*, vol. xii. p. 149.

[Illustrations were exhibited, in which a very decided reduction in the amount of silver retained by the specially fixed albumenized prints was rendered apparent by the comparatively trifling degree of colouration produced by sulphide of ammonium.]

The existence of silver compounds in the albumenized coating of photographic prints is now generally admitted to have a prejudicial influence upon their permanence, but without the advantage of exact chemical knowledge in reference to this point, demonstrated only within the last few years, an eminent authority, in reporting upon the permanence of prints, in 1856, said as follows:*—

"On the whole, it is probable, that in giving an opinion as to the comparative permanency of prints, it would be safe to consider albumenized proofs as somewhat more stable than positives on plain paper similarly printed and toned."

[Before concluding, Mr. Spiller exhibited some samples of india-rubber fabric which had become altered by the absorption of oxygen from the air, and showed a specimen of the resin extracted from it by alcohol.]

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ON THE BEHAVIOUR OF IODIDE OF SILVER IN THE LIGHT.†

BY DR. W. REISSIG, FORMER ASSISTANT OF PROF. BUNSEN.‡

Third Series of Experiments.

Solutions of Iodide of Silver and Ferrocyanide of Potassium.—We are indebted to Mr. R. Hunt's§ excellent researches for the discovery of the fact that iodide of silver, by exposure under solutions of ferrocyanide of potassium, experiences a nearly instantaneous alteration, becoming black. He used it to produce negative images upon paper.

We have already made mention, that according to Dr. Vogel's theory, those bodies should be sensitizers for iodide of silver, which easily absorb iodine and combine with it chemically. The fact of free iodine being easily absorbed by ferrocyanide of potassium, *i. e.*, of causing a decomposition in the solution of the named body—ferridcyanide of potassium and iodide of potassium, being formed by it—

$$2\,(\mathrm{Fe\,Cy} + 2\,\mathrm{K\,Cy}) + \mathrm{I} = (\mathrm{Fe_2\,Cy_3} + 3\,\mathrm{K\,Cy}) + \mathrm{K\,I},$$

has been discovered by Preuss, and has been known a long time; most strangely Dr. Vogel neglected, in the experiments he made for the support of his theory, the use of this body, which absorbs iodide so very easily.

By my experiments on the behaviour of the different compounds of the ferrocyanides, ferridcyanides, and prussiates towards the light, I found also by chance the behaviour of iodide of silver with prussiate of potassium, which, as I learnt later, had been already discovered long ago, and published by R. Hunt; and I was surprised by the extraordinary quickness with which the action of the light proceeded. Therefore, it seemed to me of particular interest to undertake a repeated examination of this remarkable proceeding, in order to study, above all, the chemical change which had not been explained in detail by Hunt; then its use to practical photographic aims was to be examined again, as promising, with the use of collodion for negatives, better results than had been obtained formerly. After this, to pursue the chemical proceeding, I brought some pure AgI (the preparation of which we have already described), covered with a concentrated aqueous solution of ferrocyanide of potassium into the daylight. From the behaviour of the iodide to the solution of silver, I expected that a solution of iodine would take place, and that this latter would excite a formation of ferridcyanide of potassium and iodide of potassium. Thus I endeavoured, by repeated trials, to establish the presence of ferridcyanide of potassium near ferrocyanide of potassium, after the method stated by Lenssen, and improved by Mohr, and to fix it quantitatively. I did not succeed in this way, therefore I was obliged to look for and to take another course. Ferro- and ferrid-cyanide of potassium not being soluble in absolute alcohol, whilst iodide of potassium dissolves in it, I founded hereupon the quantitative proof. After having exposed the AgI, covered with ferrocyanide of potassium, to a long continued irradiation, I poured over the changed blackish mass, in small quantities, some absolute alcohol, which, after a sufficiently long digestion, whilst all insoluble parts had been separated, was filtered, and then evaporated for drying. The rest, containing traces of AgI, was treated freely with water, again filtered and evaporated. In this liquid I could now refer to the presence of KI, it becoming intensely blue on adding a solution of starch and a very small quantity of nitric acid. The changed iodide of silver, liberated from ferrocyanide of potassium by cautious washing, left, by treating with $\mathrm{NaO\,S_2\,O_2}$, a body equal in its properties and chemical behaviour with the compound called proto-iodide of silver.

From these examinations, it follows that AgI, exposed for a long time under ferrocyanide of potassium, separates iodine, forming on the one hand proto-iodide of silver, on the other hand ferridcyanide of potassium and iodide of potassium; in consequence of which, ferrocyanide of potassium proves a strong sensitizer. I was persuaded, in fact, by some previous experiments, of what extraordinary sensitiveness it is possible to prepare wet (iodide of silver) plates, which are moistened with concentrated ferrocyanide of potassium. As I covered some glass plates with common bromo-iodized collodion, put them into the nitrate bath, washed away the solution of silver after a sufficient dipping, and now impregnated them by repeated affusion with a concentrated solution of ferrocyanide of potassium, and exposing it to the light for a long time in the camera, many of these plates showed, on taking them out of the slide, a distinct negative image of the focussed object. I have already mentioned that direct negatives are also to be obtained by a longer exposure of common wet plates, which are covered with a solution of nitrate of silver, if the object to be taken were struck by the direct bright sunlight. But whilst under these conditions a common plate required a 20 to 25 minutes' exposure before a distinct negative appeared, generally seven to ten minutes have been sufficient to obtain an identical result upon the same film of iodo-bromide of silver; if this film were covered with an entirely saturated solution of ferrocyanide of potassium, sometimes even after three minutes a distinctly visible image appeared. Therefore these trials also show the high sensitiveness of the plates sensitized with a concentrated solution of prussiate of potash.

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* *Journal of Photographic Society*, September, 1856, p. 122.

† Continued from p. 270.

‡ *Photographische Correspondenz*, edited by L. Schrank.

§ Hunt's "Researches on Light," p. 123.

The practical use of this remarkable behaviour is, however, excluded for photographical purposes, for the reason that the plates which are exposed and covered with a concentrated solution of prussiate of potash, after developing with pyrogallic acid, are covered with a very great quantity of transparent points, which renders them useless for printing.

I obtained the best and most satisfactory results after the following proceeding, and I gained hereby negatives which, except in having a brown tint, do not differ much from plates prepared with a solution of silver. The collodion I use for taking portraits and landscapes is composed as follows:—

Iodide of potassium	1 drachm
Bromide of cadmium	1 ,,
Iodide of cadmium	2 drachms
Alcohol (absolute)	12 ounces
Ether	12 ,,
Gun cotton	1 drm. 4 scrpls.

After pouring this preparation over the plate, it is dipped, by taking the usual precautions, into the 10 per cent. nitrate bath, which is slightly acidified, and well washed off after the film of iodo-bromide of silver is formed; then it is dipped into a diluted aqueous solution of the above-named salts of iodide and bromide,—

Iodide of cadmium	2 drachms
Bromide of cadmium...	1 drachm
Iodide of potassium	1 ,,
Water	10 ounces,

and left therein a few minutes, washed well with pure water, and dried; or we may bring upon the still moist plate, by immediate use, the solution of — 1 part saturated solution of prussiate of potash, of common temperature (saturated by 17°), four to five parts of water, after which follows the exposure in the camera.

To obtain a satisfactory result it does not require a longer, or at least only a less long time of exposure, as is necessary by the ordinary wet process. After washing well away the solution of the salts, we may develop in the ordinary manner with pyrogallic acid (two grains and a half to an ounce), to which has been added, for strengthening, a little citric acid and acetic acid, or, if necessary, equally with a solution of pyrogallic acid, by adding a few drops of solution of nitrate of silver.

As with the pyrogallic acid, we are also enabled to develop with the iron developer; caution must be used, however, in this case for washing away most carefully the ferrocyanide of potassium, some ferrocyanate of peroxide of iron being otherwise very easily precipitated upon the plate. Observing these measures of caution, and developing with iron, we may operate with ferrocyanide of potassium by very short exposure, and very easily make instantaneous pictures.

The fixing may be done best with cyanide of potassium. For photographic practice, the use of yellow prussiate of potash, in comparison with the proceeding with nitrate of silver, offers two great advantages.

Next it is, in every case, more economical and cheaper than the wet process used now, excluding the use of a nitrate bath.

As it is known, iodide of potassium dissolves freshly precipitated iodide of silver in large quantities, if iodide of potassium, in pieces, be added to such a newly precipitated portion of iodide of silver, covered but with little liquid, a quite concentrated solution of the double compound of iodide of potassium and iodide of silver ($2\,\mathrm{KI}$, AgI) is formed. This compound dissolves passably abundant in absolute alcohol, and is likewise soluble in ether, in which latter iodide of potassium is but scarcely soluble; therefore, by dissolving iodide of silver in iodide of potassium, a larger excess of the latter may be carefully avoided. If some absolute alcohol, and after this an equal quantity of ether, be added then to the limpid concentrated aqueous solution, generally from the mixture of these two substances some AgI and iodide of potassium is precipitated. If these matters be settled by decantation or filtering, this mixture of alcohol and ether dissolves a sufficient quantity of gun-cotton, forming a well available iodide of silver collodion, of which a similar one has already been proposed by Liesegang.*

Now, if such well-cleaned plates be coated with this collodion, and then put into water with a slight addition of alcohol, a collodion film containing iodide of silver is formed, by its acting, on the one hand, upon the plate, whilst, on the other hand, iodide of potassium dissolves. After a repeated washing off, these plates are, without further ceremony, appropriated for work with ferrocyanide of potassium, their sensibility not being altered at all by a minute quantity of retained iodide of potassium. I have still to remark, that all sorts of cotton are not suitable for these processes, and that those are to be preferred which form a creamy film; those plates containing only iodide of silver are also less sensible, than if the film be prepared with bromo-iodized collodion.

This is, however, no important disadvantage, especially for taking landscapes. The difficulty to prepare, in every place, a pure nitrate bath, the rapid change occasioned by quite trifling causes, as, for instance, dust, the repeated pouring into vessels not absolutely pure, being often necessary in travelling, &c.; and, in general, the difficulty of operating with wet plates out of doors, leave a superiority to the method of taking with ferrocyanide of potassium, as far as being not so easily rendered impure, and therefore made unserviceable by the solution of this salt. Considering also, on the other hand, the many troublesome operations for preparing dry plates, it results, too, that it is easier to attain one's aim by sensitizing the previously prepared dry iodide of silver collodion plates immediately before the exposing. I am not, however, of the opinion that preference may be given, *in every case,* to this proposed proceeding, before the known dry processes; but, after my experiences, I believe I may recommend it strongly to the attention of my colleagues in this branch of science, and I will not fail publishing later on the further experiences I make, having been prevented, myself, recently, from making further experiments by the unfavourable winter and press of business.

ON THE REDUCTION OF CHLORIDE OF SILVER.

Fusion with carbonate of soda has the disadvantage of being a furnace operation, in which the metallic silver is obtained partially fused together, and partly as small corns sticking to the sides of the crucible, by which loss is easily occasioned. For this reason, reduction in the wet way, by means of zinc, should be preferred. A block of zinc, which is in connexion with a silver wire, is covered with thick linen, or with a moist bladder, in order to retain the metals contained in the zinc, lead, tin, &c.; this block of zinc is placed in the paste of chloride of silver, and the silver wire is bent so that its point touches the chloride. The reduction commences from the point of the silver wire where the white chloride assumes a grey colour and a spongy consistence. This action extends itself to the last grain of chloride in connexion with the cake, and it is easily seen whether the decomposition is complete. The zinc is taken out, adherent particles of silver washed back into the dish, and the silver sponge is washed out, first with some dilute acid so as to dissolve precipitated zinc, and finally with warm distilled water, till every trace of silver in the solution has disappeared, which is tested with nitrate of silver. Galvanically reduced chloride of silver always retains traces of chlorine, which separate on solution in nitric acid as chloride of silver, and necessitate a filtration.

For dissolving silver, it is best to use a somewhat deep porcelain dish with a lateral handle and with a good lip. The silver is introduced, and part of the acid added, the dish being covered with the bottom of a retort or a flask, so as to retain any spurtings, which thus return to the dish. The nitric acid must be pretty dilute, because nitrate of silver is far less soluble in nitric acid than in pure water. Towards the end of the solution, when the liquid is already concentrated, distilled water must be added as well as nitric acid. Often in the hot liquid, when solution stops, it may be started again by the mere addition of water, and only when this attack has ceased must nitric acid be added, until finally all the silver is dissolved.—*Mohr on the Prussian Pharmacopœia.*

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* Liesegang, *Photograph Archiv,* 1865.

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Proceedings of Societies.

North London Photographic Association.

The last meeting of the present session was held in Myddelton Hall, on the evening of Wednesday, June 8th, Mr. W. Warwick King in the chair.

The minutes of a former meeting were read and confirmed.

Mr. Allen read a paper on Photographic Lenses, in which he detailed his experience on the suitability of various lenses for different kinds of work. No comment or discussion followed, and after a few remarks from the Chairman, and a vote of thanks,

Mr. Spiller read a paper on "Photography in its Chemical Aspects" (see p. 280). At the close of his paper, amongst a variety of specimens exhibited, Mr. Spiller called attention to some examples of the decomposition of india-rubber when in thin layers in water-proofing textile fabrics. In a piece of thin "patent waterproof felt," manufactured from cotton-wool and india-rubber, it was shown that the india-rubber had changed into a brown powdery resinous substance, resembling common colophony or lac resin. The decomposition was similar to that which took place, as Dr. Hoffman had shown, in gutta-percha, and the amount of oxygen contained in the substance was similar to that found in the decomposed gutta-percha, namely, nearly 28 per cent. Details will be found in article giving Mr. Spiller's memoir, read before the Chemical Society, on p. 109 of the Photographic News, vol. ix. Mr. Spiller's object in calling attention to this, was to suggest that the proposal which had been made to increase the permanency of photographs by filling the pores of the paper with india-rubber or gutta-percha was worse than useless, as the decomposition which ensued left a discoloured powder only on the paper.

Mr. Spiller also exhibited some of the photographs produced at Woolwich, illustrating the artillery drill as conducted in connection with the Arsenal. He further showed a print which had been treated with peroxide of hydrogen, showing that it had no action on the silver in the whites of the print, as a portion which had been treated with sulphide of ammonium at once showed a deep brownish-yellow discolouration. A piece of the white of the same print, treated with a mixture of hyposulphite of soda and carbonate of ammonia, and then tested with sulphide of ammonium, showed, by the much less intense discolouration, that a large portion of the silver from the whites had been eliminated by the ammonia and hypo. Mr. Spiller also showed, in a test-tube, a sample of the crystallized double hyposulphite of soda and silver.

After some general conversation,

Mr. Allen asked, supposing all the silver except that forming the image could be removed from the print, whether the portion remaining, and forming the dark of the print, being silver, would not be liable to oxidize by the action of the atmosphere.

Mr. Spiller said the silver in the whites of the print existed as an oxide in combination with albumen, whilst that forming the image consisted of metallic silver. The latter, being metallic silver, might be expected to be quite permanent if properly protected; that in the whites being combined with albumen, a body itself containing sulphur, was much more liable to change, from which it might become sulphide of silver. This change might be brought about either by external or spontaneous internal causes.

Mr. Allen said that he had found albumenized prints more prone to change than those on plain paper. He wished to know, also, would the deposit of gold was not liable to oxidize.

Mr. Spiller said, of course an oxide of gold could be formed chemically, but gold was not liable to oxidize from atmospheric action.

Mr. Foxlee said, suppose all the hyposulphite of soda be got rid of by peroxide of hydrogen, would photographic pictures change.

Mr. Spiller said, the silver remaining in the whites would always be liable to change in an atmosphere contaminated with sulphur. The peroxide of hydrogen gave no immunity from this.

Mr. Foxlee said, would the silver in the blacks change also? He pointed to some prints produced by himself ten years ago, which had not faded.

Mr. Spiller said that there were doubtless hundreds to be found which had been done as long as them, or longer, which showed no change, especially if they were well protected; but they were liable to change when brought into contact with circumstances tending to produce decomposition.

Mr. Foxlee asked if peroxide of hydrogen would not give an additional lease of stability.

Mr. Spiller said it was doubtless a step in the right direction.

Mr. Foxlee referred to Mr. Hart's experiments some time ago, in which he understood that an unwashed proof, treated so as to eliminate the hyposulphite, had remained without change. He asked Mr. Hart to state some particulars.

Mr. Hart confirmed Mr. Foxlee's statement as to the result of his experiment, but having promised to bring the subject before the next meeting of the South London Society, he scarcely felt at liberty to enter into it now.

Mr. Wharton Simpson called specific attention to the print exhibited by Mr. Spiller. The brown or yellow discolouration shown in the sky of that which had been treated with peroxide of hydrogen was the result of anticipating a decomposition which time, moisture, contaminated atmosphere, and other disturbing causes might bring about. Instead of waiting for the formation of sulphide of silver by any of these causes, he had produced it at once by applying sulphide of ammonium, and thus showing the final result to which the print was at any time liable. The addition of carbonate of ammonia to hyposulphite of soda was clearly very valuable, as the stain produced by sulphide of ammonium afterwards was very slight indeed, showing that much silver had been removed.

The Chairman expressed his high appreciation of the sound, valuable deductions from carefully-conducted experiments with which Mr. Spiller had favoured them, and trusted that he would let them know the results of further experiments in the same direction. He had pleasure in moving a very hearty vote of thanks, which were accorded by acclamation.

Mr. Spiller, in acknowledging the thanks, promised another paper, at some time, on further experiments for the perfect fixation of the print.

Mr. Ross exhibited some specimens by Mr. Foxlee.

Mr. Johnson exhibited some fine panoramic pictures, by Mr. Braun, of Swiss scenery, and some of views in Burnham Beeches, with groups of portraits of well-known photographers.

Mr. How exhibited some fine microscopic enlargements sent to Dr. Maddox by Dr. Woodward, U.S. Mr. Hislop explained that they were very large amplifications of well-known test objects, the *pleurosigma angulatum*, and were exceedingly well defined.

The proceedings then terminated.

London Photographic Society

The last monthly meeting of the present session was held in King's College on the evening of Tuesday, June 12th, Lord Chief Baron Pollock, President of the Society, in the chair.

The minutes of a preceding meeting were read and confirmed. The following gentlemen were duly elected members of the Society:—Lieut.-General Williams, Mr. James Martin, and Mr. Benjamin Green.

The President said he had been engaged in the law a great many years; but he was tempted to say that he had never had such a bad case to state as on this occasion. At a former meeting, the statement had gone forth that certain medals would be distributed at the present meeting. But a serious difficulty stood in the way of his fulfilling that promise. This difficulty was twofold. In the first place there were no medals to distribute. Perhaps many would think that difficulty was sufficient without going further. But even if the medals had been ready, many of the persons who were to receive them were absent; apologies having arrived from three or four of them. A specimen of the medal was on the table. It was very beautiful, but he could not account for its slow production, and could only express his regret that it was not ready for distribution. He then proceeded to regret the infrequency of his attendance, which was due to a fact he had been slow to become conscious of—namely, that he was getting an old man. He hoped, another year, to make arrangements which would enable him to attend more frequently; but at the same time, when they could find any one to render them better service as a president, or more to advance the Society and the science it represented, he would readily resign. After some observations on the immense aid lent by photography to science, and especially to the science of light, he thanked them for their universal kindness to him, and sat down.

Mr. Durham said he hoped members would understand that the non-completion of the medals was not the fault of the secretary or council. They had had repeated promises that they should be completed by the 1st of June at latest, but they had been disappointed up to the last moment. The fault was solely that of the producer, and not of the council.

The Secretary read a letter from Mr. Dallmeyer, accompaning some specimens of the work of a new lens he was about to introduce. It gave perfect freedom from distortion, and was therefore suited for architecture. It included an angle of 105°, and worked rapidly, its smallest stop not being smaller than 1-40th of the focal length, and the largest 1-15th. The specimens, which were 12 × 10, taken with a 7-inch focus, included architecture near the edges of the picture, were perfectly defined to the edges, and perfectly straight lines.

The Chairman called attention to some very beautiful solar camera pictures by Mr. Mayall, including portraits of Mr. Glaisher, Mr. Gladstone, and Mr. Peabody.

Attention was also called to some fine figures and groups, by Mr Robinson, taken with Dallmeyer's new portrait triple lens.

The meeting was then adjourned until the second Tuesday in November.

◆

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 13th June, 1866.

A French optician, to whom photography owes great progress, M. Derogy, has lately added to the improvements in the instruments for enlarging. Not only are better results obtained, but the price is very much diminished. Like those instruments of the kind already known, this one of M. Derogy is composed of a reflector with several movements, of the camera containing the condenser, of the slide, and also of an enlarging glass. If the operator choose, a diverging glass of *flint* can be added to the condensing one of *crown*, which obviates the aberration, both spherical and achromatic. My coadjutor, M. Perrot de Chaumeux, who has aided me in practical experiments with these instruments, has not found much difference in the results obtained by the condenser alone, and with the two lenses. Only in the latter case there is evidently a great loss of light. It is very certain, in theory, that the spheric and chromatic aberrations ought to be corrected, but in practice there is little to be gained by this correction, and every means ought to be employed to lose the least possible rapidity.

In M. Derogy's instrument, the reflector, properly speaking, is independent of the camera, but to prevent the reflected light of the mirror from escaping in the interval that separates it from the condenser, these two parts of the instrument are joined together by a piece of linen impenetrable to the light. The operation is made directly on chloridized paper, or by development on iodized paper.

M. Derogy is constructing a model of a solar camera, by the aid of which operations can be made in a garden, or on a terrace, &c., &c.

The analysis of bodies, and the exact knowledge of the weight which constitutes them, is an indispensable condition of the progress of the sciences, and of their application to industry: it is certain that from the laboratory issue the first ideas of most modern discoveries. It is with this conviction that I draw attention to a book just presented by M. Dumas to the Academy of Sciences. This work, upon the atomic weight of simple bodies, according to M. Stas, contains all the details upon the methods of chemical analysis. The author wishes to make easy all the labour which is indispensable in the laboratory, and shows all the causes of error arising from the impurity of materials, &c., &c.

This information, with regard to photography, is of great value, for there is not an operator who does not know that the employment of a pure chemical is one of the principal guarantees of success. To show a method—simple, rapid, and inexpensive—of ascertaining the precise composition of products, as well as their falsification, is to render a great service to photographers. For instance, how many adulterations do the English journals point out in the chloride of gold?—in the nitrate of silver? And many other products, if not all, which come into the hands of manipulators, are in a state of adulteration or amalgamation. It is very important that the photographer should know the nature of these falsifications. The author, in this book, occupies himself with the study of the conditions of fabrication, and of the employment of instruments of glass, porcelain, or platina for experiments. He has solved, among other things, a problem very interesting to photographers, that of obtaining a uniform temperature during several hours, or even days. He describes a system of gas stoves, modified in their forms according to the duration of the reactions to be produced, but always capable of producing a temperature nearly constant during the experiments, and thus permitting the operator to regulate at will this once difficult task. All those who use alcohol or charcoal as a means of heating will appreciate the advantages of this system.

Dr. Albert Moistessier (of Montpellier), whose name is well known to photographers, has just published a book under the title of "La Photographie appliquée aux Etudes Micrographiques," showing a series of proofs of the greatest interest to science.

Permit me to terminate this correspondence by a little anecdote, which shows how many artists, even yet, notwithstanding all the services that photography has rendered them, bear rancour to the art:—

Numa Blanc is not only one of the best photographers of portraits, but he is also a very distinguished painter. Having last year made, at Baden, a charming group of the principal members of the Théâtre Français playing at dominos, he had the idea of enlarging it, and transforming this proof into a charming *genre* picture, in which were to be seen, full of life and expression, the well-known faces of Provost Bressant, Coquelin, Got, &c. The work, when finished, was admired by every one, including artists and was presented to the jury for admission into the present Exhibition of Paintings in Paris. The picture was too true, for the jury could see in it only the precision of the camera; they praised the composition and the execution, but refused to admit it, as being too perfect! Has this fact any need of comment?

Ernest Lacan.

MODIFIED TANNIN PROCESS.

Sir,—In reference to my late communication, which you were good enough to publish in No. 404 of the Photographic News for June 1st, under the head of "Modified Tannin Process," I beg to inform your readers that since I came to the North I have met with some apparently good hard, or spring water, which fails in producing the fine negatives I have previously obtained elsewhere with *hard* water; but by adopting the plan of using the solution of salt alone, *without* the tannin, as previously described, rinsing this off again from the jug of water, and then applying the tannin solution *alone*, and again rinsing this off also, the negatives are quite as good as can be desired. So that, perhaps, it will always be a safer method to adopt this salting and tanning of the excited films separately, as I have done before, occasionally, and only combined the the two solutions to save trouble and one washing, with similar results either way previously.—I am, very truly, yours, E. T.

Gosford, Long Niddrie, N.B., June 11th, 1866.

HEALTH IN THE STUDIO AND DARK ROOM.

Dear Sir,—From Mr. Williams's answer to some one else (I forget the gentleman's name, not having the News at hand), about his paralysis and pains not arising from cyanide because he never uses it, the idea occurs to me that, probably, inhaling constantly the fumes of acetic acid that is necessarily in the developer might produce the pains mentioned. Why I throw out this hint is, from the circumstance of a lead pipe which runs through my dark room being eaten nearly away from the fumes only of acetic, which emanate from the developer, as it stands in an open wide-mouthed bottle near to it.

That acid is contra-indicated in the medical treatment of all rheumatic affections, is quite established (I think the symptoms of your correspondents are of the rheumatic type), and that constantly inhaling the fumes of acetic acid, I think, must attack the gelatinous membranes of the human system, causing a morbid irritation, inflammation, weakness, and prostration.

Photographers have now ample proof of the great affinity gelatine and acid have for each other, since the experiment of gelatine in the iron developer.

Another proof of the poisonous atmosphere we poor photographers have to breathe, is, that all insects seem to shun our black apartment. Can any one recount an instance of a house-spider building his web in a dark room, or of any other insect taking up his abode therein. I have for many years made a particular note of this circumstance, and have never seen any but a stray fly sometimes buzzing around the plate and yellow window, as if afraid to alight, and gladly making his exit as soon as the window was opened.—I am, dear sir, yours obediently,

Ten Years a Photographer.

174, *Regent Street, W., June 6th*, 1866.

Sir,—There is something more in the "nervous feelings" of photographers than those who, happily, have not experienced them may imagine.

I, too, an amateur, have suffered much in the same way as your two previous correspondents. Like them, my limbs are, or rather were, often benumbed, if allowed to rest long in any position. A metallic taste was often present in my mouth, and generally I was ill, unfit for work, and out of sorts. Tracing, as I thought, these evils to my daily habit of dabbling with chemicals, I experimented less, and for the last year have done but little. I am better, but in one arm a sort of conscious weakness still remains. I am not a surgeon, nor skilled in the action of the various chemicals we use on the system, but venture to think that the liquid silver, which so often stains our hands, and the exhalations from which are so often inhaled, has some deleterious effect on the human frame.

Are there any of the medical profession who practice our pleasing art? If so, I venture to ask them whether they know, and will publish their knowledge, on this point? I have, fortunately, never taken mercury, have never been salivated, know nothing of its effects personally, but some "fast" friends of mine, less lucky, have recounted symptoms something akin to mine. If there be any foundation for my suspicions, the evil can be easily guarded against, and, for our common good, words of advice in your columns ought to be given. I am sure you will afford the space, and thus again earn the thanks of the profession, and amateurs and enthusiasts like your faithful servant, W. St. John.

Photographic Notes and Queries.

Photographers' Provident Society.

Sir,—Would it not be more much reasonable of the working photographers—if they wish to found a Society—to commence at once to subscribe to a fund for themselves, instead of waiting for others to start it for them? I, for one, should be glad to join, if any established photographer would be kind enough to act as Secretary, and anything such as the "Hearts of Oak," or like Society, were contemplated, with, say, an entrance fee of five, six, or seven shillings, and annual subscription of like amount.

As such a Society would be of great use to a class of men who are liable to be thrown out of work in winter, I, for one, should be greatly obliged if you would propose something of the sort. Of course all gifts still could be thankfully received, and the givers elected honorary members.—I remain, sir, yours obediently, Rusticus.

Photographic Enlargements.

Sir,—As a subscriber to your journal, I ask the insertion of the accompanying remarks. The Photographic News is full of advertisements soliciting enlargements, most parties promising something very good, mostly, however, only to disappoint you. One firm says: "No *special negative* is required," and that their system of enlarging is fully appreciated, and that life-size portraits are taken from *ordinary* printing negatives. This I do protest against, as being likely to mislead the photographic profession. As far as my experience goes, ordinary printing negatives will *not* produce good enlargements. Indeed, I have been much annoyed and perplexed how to act in the matter.

Many of these enlargements are ordered afterwards, being quite an after-thought by the parties desiring them. Therefore, to send such negatives to be enlarged only leads to unpleasantness to both sides.

I would suggest that, in all cases, houses professing to execute perfect enlargements should themselves make such a copy as they think most suitable for their own individual purpose.

I have suffered severely from the present system, from the vile rubbish I have had to paint upon.

The other day I wrote a letter to one of our leading houses, and asked them if they would enlarge a negative for me, on the condition that it should be on my approval; and the reply I received is as follows:—"Sir,—I decline to do enlargements on approbation; it requires a very good, thin negative, full of detail, to make a good one, and I scarcely ever get one fit for the purpose. A dense printing negative is of no use. I should say the card enclosed is from one." Here, sir, is the difficulty. These portraits are taken in the ordinary way of business, and I do maintain that gentlemen undertaking to produce first-class enlargements should themselves undertake the responsibility of copying to obtain the class of negative required.

I have only the last week been accused of dishonesty, unusual knowledge, and have received an amount of insolence that, as a professional man, I never was subjected to before, merely because I objected to pay for pictures that are useless.—I am, sir, yours most truly, An Artist.

[It should be distinctly understood by everybody that it is impossible to produce a really good enlargement without a really good and suitable negative; the most suitable for that purpose not being the most suitable for ordinary printing. No amount of copying would produce a really suitable negative from an unsuitable negative, and in every copying process there is risk of loss of definition, and of various imperfections. It is only by producing at the outset a really suitable negative that the best results can be obtained; whilst many photographers seem to think anything will do for enlarging, especially if the defects of the print have to be hidden by the work of the colourist.—Ed.]

Opal Pictures.

Sir,—To those photographers who have not tried the process for obtaining these pictures, and are unwilling to incur the expense of a special printing-frame for the experiment, I would recommend, as an *addendum* to your suggestion, that the ordinary printing-frame may be used; that the progress of printing be ascertained by loosening one half of the back, and *looking through* both opal and negative. The proper colour may be ascertained after a trial or two. I have found a dark pink to be the proper stage.

May I be permitted to offer my congratulations to you, as the discoverer of this valuable process, giving such beautiful results, and with so little extra trouble? Every person to whom I have shown my specimens has been delighted. The texture of the film, compared with that of paper, should alone be a recommendation to their general adoption. The closer you examine them the better they appear. Test them in this way with an ordinary carte.—I am, Sir, yours obediently,

Twerton East, near Bath, June 5, 1866. J. Poole.

Mr. Gordon's Modification of Bartholomew's Process.

Sir,—I beg to forward three prints from negatives by the modified "Fothergill" process by Mr. Gordon. I consider the thanks of photographers generally are due to him for the manner in which he has brought this modification before the public.

I have tried most of the dry processes, including the collodio-albumen, tannin, gelatine, &c., but find this the most simple, clear, and certain, as out of eight plates prepared I did not have a single failure.

Will you please state, in your next, whether the prints enclosed are up to the mark for dry plate photography. They should not be examined too critically, as they are the first attempts by this process, and I have no doubt something far superior can be produced with more experience in developing, as I find that, working with such concentrated developing solution, very great care is necessary in using it to prevent getting a hard negative from too much density. The exposure was forty seconds with a "Grubb" lens of 15-inch focus and half-inch stop.—Your obedient servant,

J. F. Church, Sergeant, Royal Engineers.

R. E. Establishment, Chatham, June 12*th*, 1866.

[The prints enclosed are most excellent, and scarcely distinguishable in any way from wet plate photography.—Ed.]

Miscellaneous Science.

The Relative Value of Disinfectants.—In a recent report made to her Majesty's Commissioners, by our esteemed collaborateur, Mr. Crookes, upon the value of disinfectants, some important experiments, which bear upon general sanitary science, are recorded. One of them, showing the relative value of chloride of lime and carbolic acid as disinfectants, deserves serious attention. Some meat was hung up in the air till the odour of putrefaction was strong. It was then divided into two pieces. One was soaked for half an hour in chloride of lime solution, and was then washed and hung up again; the offensive smell had entirely gone. The other piece of meat was soaked in a solution of carbolic acid, containing one per cent of the acid; it was then dried and hung up. The surface of the meat was whitened, but its offensive odour was not removed, though it was masked by the carbolic acid. In two days' time the bad odour had entirely gone, and was replaced by a pure but faint smell of carbolic acid. In a few weeks' time the pieces of meat were examined again. The one which had been deodorized with chloride of lime now smelt as offensively as it did at first, whilst the piece treated with carbolic acid had simply dried up, and had no offensive odour whatever. Even after a month's exposure no change had taken place. This shows us that whilst chloride of lime merely removes the smell of decomposing matter—in fact, is a deodoriser—carbolic acid actually prevents decomposition, and is, therefore, in an eminent degree antiseptic.

The Carlevaris Light.—The experiments made at the close of last month, in the theatre of the Technical Institution, Genoa, were attended with great success, and loudly applauded. This light is an oxy-hydro-magnesian flame, and is obtained by placing in the flame of a mixture of hydrogen, or coal gas, with air or oxygen, spongy magnesia, a substance of very small cost. The flame is white, rich in actinic force, fixed, and developing less heat than other lights. The expense is very trifling, a light equal to four wax candles only costing two-tenths of a penny per hour. A new trial also took place in the lantern of the Genoa lighthouse. It proved that this light was superior to that of the oil-lamps representing an illuminating power of twenty-three Carcel lamps, and yet the cost was only 3d. per hour.

A New Anæsthetic.—Dr. Bigelow, of Boston, announces that he has procured a new anæsthetic, which he calls "rhigolene," and is a preparation of petroleum and naphtha, boiling at 70° Fahr., and having a specific gravity of 0·625. Dr. Bigelow was led to make his experiments by Dr. Richardson's production of anæsthesia by freezing, through the agency of ether vapour reduced to 6° below zero. The petroleum liquid easily depresses the mercury to 19° below zero, freezing the skin with certainty in five or ten seconds. Dr. Bigelow says that the rhigolene is more convenient and more easily controlled than the freezing mixtures hitherto employed. Being quick in its action, inexpensive, and comparatively odourless, he thinks it will supersede ether or chloroform for small operations in private houses. It is not adapted for large operations, a first congelation being evanescent, and a continued or general congelation rendering the dangers of frost-bite or mortification imminent.

Peroxide of Hydrogen.—Professor Schonbein has discovered a new and very ready method of procuring the peroxide of hydrogen. It consists simply in agitating, in a large flask, to which air has access, amalgamated zinc, in powder, with distilled water. Oxygen is then absorbed by both the zinc and the water, with formation of oxide of zinc and peroxide of hydrogen. The peroxide of hydrogen obtained by this method, unlike that obtained by the ordinary process, is quite free from acid, and so may be kept for a long time without decomposition. It does not contain, moreover, a trace of either zinc or mercury, but is absolutely pure. This new process has therefore great advantages over the old process of preparing peroxide of hydrogen, both as being far simpler and more expeditious, and as yielding a much purer product; but it is almost as far as the old process from yielding peroxide of hydrogen cheaply enough for use in the arts.—*Mechanics' Magazine.*

Talk in the Studio.

Magic Photographs.—A correspondent suggests that, as the season for selling local views of watering-places and other summer resorts is at hand, an agreeable variation, tending to an increased sale, might be made by preparing stocks of magic photographs consisting of a series of the various views of any neighbourhood, which visitors would eagerly buy, to be developed and examined at home, when they have returned from their summer rambles.

Card Groups.—We have received from our esteemed friend, Herr Ludwig Schrank, Editor of the *Photographische Correspondenz*, a charming card picture, as illustrative of a style of portraiture now much in favour in Vienna. It is a card of the ordinary dimensions, containing a group of seven persons, distributed lengthwise on the card. It represents the interior of a drawing room, a panelled wall, chimney-piece, &c., forming the background. Two of the figures are seated at a grand piano, playing a duett, whilst a third turns over the music; a fourth, standing near, leaning on the chimney-piece, apparently listens to the music; a fifth sits with an embroidery frame on her lap, engaged at work; another sits before a small writing-desk, or Davenport, writing a letter; whilst another stands by with a letter in her hand, apparently in conversation with the last. The scene is simple and domestic: a family group at home. The photograph is by Herr Angerer, and is most excellent; the grouping is admirably managed, the photography exquisitely perfect and delicate, at once excellent in definition, light and shade, and pictorial effect.

Photography at the French Exhibition.—We learn that application has been made to Mr. England to undertake the whole of the stereoscopic photography at the International Exhibition of 1867, to be held in Paris. Whilst the compliment to our own countrymen implied in this application gives us much pleasure, we feel assured that all concerned in the success of the project will be the gainers by the carrying out of such an arrangement. The experience gained in photographing the Exhibition of 1862, and the perfect success with which it was carried out, afford the surest guarantees of fitness for an equally successful management of the same work in Paris. Notwithstanding that the circumstances which materially control the operations of a photographer engaged in such work are by no means always conducive to excellence, we question whether ever an undertaking so extensive, in the course of which little short of a million prints were issued, was carried out with more complete success than the photography of the last Exhibition in Hyde Park, by Mr. England, for the London Stereoscopic Company.

To Correspondents.

A Reader.—You do not state the nature of the danger from the use of ferridcyanide, regarding which you enquire. Do you mean danger to the operator or to the negative? We are not aware of any danger to either. Ferridcyanide of potassium is not like cyanide of potassium, in being a very active poison, or readily giving off fumes of prussic acid. 2. The small spots in your print are due to iron spots in the paper.

Tyro.—The tone of the print you enclose is not bad; but it is much warmer than that usually given by the lime bath. 2. You are not sufficiently explicit in your statement of difficulty with a lens, so that we are left in doubt as to whether the trouble is in using the portrait combination for landscape purposes, or in using the front lens of the portrait combination. Portrait lenses—in fact, all double combinations—are very liable to the spot of light in the centre of the plate, when used against the light. The use of a stop in contact with the front lens is a good remedy. If it be when using the single lens, it must arise from some error in the mounting. It is difficult to so arrange the mounting that the stop of the portrait lens shall be in the best position for the landscape lens; hence lenses of all work are rarely first-rate. 3. The chief difficulty in employing the plan you propose, of developing with iron in the field, and intensifying and fixing at home, is, that if you let the film dry, it is sometimes apt to split or leave the glass in subsequent operations. It is a good plan, after developing and washing, to coat the plate with equal parts of golden syrup and water, which will keep it moist, and then intensify, &c., at home.

Unifoam.—A good half-plate portrait lens may be used with propriety for taking a group of twenty volunteers. You must use a stop sufficiently small to get the proper amount of definition. By carefully arranging the men in a curve to suit the lens, you can manage with a large stop. 2. The new portrait triple is the best for such work. 3. The same lens will answer well. Take care to get your group arranged against a good background, with the light falling well on them.

Photo.—You cannot protect an invention, by registration, which depends on the arrangement of parts; that must be done by patent. Registration only protects designs. The shape or pattern of anything may be protected by registration; but not its combination of parts. Registration protects a design for three years. A patent protects for three years, at a cost of about £50; the protection is extended for four years more on payment of further fees, and finally for seven years more on further payment, making fourteen years in all, at a total cost of about £200. It is desirable to obtain the aid of a patent agent.

Gamboge (Windsor).—Newman's "Harmonious Colouring Applied to Photographs," price one shilling, will answer your purpose best. To be had at 24, Soho Square.

A Student.—It is not improbable that the spring water to which you refer contained traces of sulphate of lime or soda, in which case some sulphate of silver would be formed in the film. If this be so, the remedy will be the addition to the bath of a few drops of a 5 per cent. solution of nitrate of baryta, which will precipitate the sulphate as a sulphate of baryta. We are quite unable to answer your present query about No. 7 of some examples formerly sent up. It is very necessary that each week's series of questions, and all relating to them, should be dismissed when answered. Yours was one of scores with nothing to recall it to our mind now. Of those now sent, Nos. 1 and 2 are pretty good, but not quite sharp. A more graceful effect might have been obtained by making a slight variation between the turn of the body and the head. No. 3 is sharp, but is a little over-intensified. The painted slip forming part of the background is an abomination; the pedestal is clumsy, and of exactly the same light colour as the coat.

Developing Powders.—A weekly reader says:—"I can endorse every word 'Experte Crede' has said in the Photographic News of the 1st inst., regarding the developing powder (?) from Jersey, mine having arrived in a similar sticky syrupy mass. I wrote at once to 'Bonâ Fide,' stating what had occurred, and suggesting, for the future, packing the powder in tinfoil, to avoid any risk of damp. Contrary, however, to 'Bonâ Fide's' assertion in this week's News, I have received no other sample of the powder." We regret that some of our correspondents have been so unfortunate. We can only repeat that we accurately described the article sent to us, and it is inexplicable that with the power to produce a good article, the inventor should waste his opportunity by sending worthless trash.

James Gadsby.—Thanks. We will avail ourselves of an opportunity to see the stand.

D. Hornby.—We quite coincide with your views as to the great importance of neat manipulation in dry plate work. We hope shortly to have time to describe some manipulatory details of Mr. Gordon's working. His plates dry spontaneously, resting on a corner of a stand where they touch nothing but glass, which is washed every time it is used. So far as Mr. Gordon's experience has gone, the plates do not keep in their best condition more than a week. If kept a fortnight, he gives them a longer exposure. The sensitiveness, when in their best condition, is found, however, to be greater than was at first supposed. It is found possible to reduce the exposure to little longer than that of wet collodion, the use of stronger plain pyro solution in developing compensating for short exposure. We should use about 15 minims of glacial acetic acid in place of one grain of citric acid.

Amateur and Subscriber.—Sir John Herschel informs us that bichloride of platinum is used. If slightly acid, add cream of lime to slight over-neutralization, then dilute largely with lime water. If baryta be used, any precipitate that forms in the dark must be separated. The proportions matter little, and the solution rendered weak by dilution is used.

Litho.—An acid silver bath and organic iron developer will give you the best negative of a print from which to produce a photo-lithographic transfer. Strengthen after fixing, if necessary.

W. C. J.—The new portrait triple will answer your purpose better than the ordinary triple for portraits and groups. We have not had much experience with that of the advertisements of which you require, and do not know sufficient of it to recommend it.

Orwell.—The cabinet portraits which Messrs. Window and Bridge forwarded to us, with a letter giving dimensions, a few weeks ago, were, in porportions of figures and general treatment, just like cartes de visite, but larger.

Cymro.—An article sold as diamond cement will answer. If skilfully used, marine glue shellac will answer. The former requires the parts to be made hot without smoking them, and then heating the marine glue until it melts. Such a junction is very strong. Shellac may be used in solution in spirit or naphtha, but is not so strong as the marine glue. White blinds will answer every purpose. We are glad your studio answers well. Saccharo-sulphate of iron was first proposed as developer by a correspondent of the Photographic News, in April, 1859.

A. B. S. N.—The quantity of water employed with a given quantity of the salts forming the toning solution only affects the length of time required to complete the toning. We generally use about five or six ounces of water with each grain of chloride of gold. There is no especial order or mode of mixing to be followed. 2. We do not prefer No. 1 to the ordinary single lens; No. 2 is undoubtedly best, both in results and rapidity, especially for landscape work; No. 3 is slow.

M. Row.—The number of plates a given quantity of solution will sensitize cannot be stated with accuracy, as it depends on the thickness of the collodion film and the proportion of haloid salts it contains. As a rule, however, the bath is found to get weak more rapidly than it diminishes in quantity, and it is well to replenish the 30-grain bath from a 40-grain stock solution. 2. Sunning a bath is placing it, either in a clear bottle or an open dish, in the direct rays of the sun, so that any organic matter present may be blackened and thrown down, light having the power of reducing organic matter in combination with silver, and the more readily if the solution is slightly alkaline. 3. Neutralize with carbonate of soda, and then sun them. They will then probably work well. 4. The milky-looking water derived from washing prints contains a good deal of silver. It should be saved in a large jar, and the silver precipitated as a chloride, either with common salt or hydrochloric acid. The water is from time to time drawn off, leaving the precipitate at the bottom. This chloride of silver may be either sold or reduced in a crucible. 5. All prints should be trimmed before toning, and the clippings will yield a good deal of silver. Clippings of fixed prints are not worth saving. 6. In taking standing figures, the lens should be opposite the chest. 7. Tracing calico will answer best for keeping out direct sunshine, and diminish the light as little as possible. There is improvement in the specimens. Be careful in manipulation to cover the plate with one sweep of the developer, and so avoid stains. 8. There is some difficulty in obtaining very good results in copying glass positives, from the fact that their highest lights are of a much lower tone than the lights in a paper print, and also from the reflecting surface. The latter may, with a little care, be managed.

George W.—When you speak of marks on your plate, without saying whether they are transparent or opaque, we cannot very well point out their source. If, as we suppose, they are white marks of reduced silver, they arise from the heat of the weather, long keeping of the plate between exposure and development, and a bath containing organic matter.

Charles Syndercombe.—Many persons would prefer the tone of No. 2. But it appears to us that you have only to continue the action of the toning bath long enough to produce the tone of No. 1. If it work too slowly, add a drop or two of a fresh solution of chloride of gold. Immersing the print in the toning bath again, after fixation, will not injure it, unless the bath be acid. But it is better to avoid such a practice.

Received.—"Photographie au Charbon," par Despaquis (Paris: Lieber).

Mr. J. Alexander.—Subscription paid to No, 421.

Several Correspondents in our next.

Photographs Registered.

Messrs. W. Woodward and Co., Nottingham,
Four Photographs of B. Osborn, Esq., M.P.

Mr. J. Poat, Stonehouse, Devon,
Two Photographs of Mr. W. Murphey.

Mr. J. Pender, Waterford,
Photograph of Rev. Dr. Flynn.

Mr. Edwin Thos. Hicks, Islington, Liverpool,
Photograph of Mr. T. H. Sweeting.

Mr. Thomas E. Seen, Weston-super-Mare,
Photograph of Rev. W. Hodgson.

Mr. F. Woodcock, St. James's, Shaftesbury, Dorset,
Photograph of St. James's, Shaftesbury, Church.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

PATENT OFFICE

THE PHOTOGRAPHIC NEWS.

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ELIMINATION OF HYPOSULPHITES FROM PRINTS.

Mr. F. W. Hart read an interesting paper on this subject at the last meeting of the South London Photographic Society, when he introduced an elegant adaptation of a well-known test, and demonstrated its action before the meeting. Something more than two years ago, Mr. Hart proposed, before the same Society, to eliminate the hyposulphite from the print by means of an oxydizing agent. The recent attention which the subject has gained, in consequence of the proposal of Dr. Angus Smith to effect the same end by means of peroxide of hydrogen, has induced Mr. Hart to recur to his former suggestion, and to bring it before photographers in a simpler and more practical form. He before proposed to use chlorine water; he now uses hypochlorite of soda. Besides proposing a simple and cheap mode of converting the hyposulphites into sulphates, and suggesting a very simple test for the completion of the operation, Mr. Hart also suggests a mode of easily eliminating the trace of chloride of silver produced by the agents employed in effecting the end in question.

It is to be noted that each of the methods proposed for getting rid of hyposulphite depends on a decomposition in which oxygen is liberated, which, combining with the hyposulphite, converts it into a sulphate. Chlorine water is easily decomposed in the presence of any body having an affinity for oxygen, the chlorine combining with the hydrogen of the water, leaving the oxygen at liberty to combine with any body present having an affinity for it. Peroxide of hydrogen is easily decomposed, giving off one equivalent of oxygen. Hypochlorous acid, containing one atom of chlorine and one of oxygen in a state of feeble combination, is one of the most powerful oxydizing agents; hence the hypochlorite of soda is one of the most available agents for effecting the end in question, being readily decomposed when in solution, and so yielding oxygen to any body present having an affinity for it. In each case the hyposulphite is brought into contact with an oxydizing agent, by which it is converted into a sulphate. Whatever advantage is to be gained depends upon this reaction. It is interesting to enquire, then by which method the end is most easily and cheaply obtained, and what drawbacks there are to the use of either.

The chlorine water may be dismissed as less convenient than hypochlorite of soda for effecting the same end; chlorine in an uncombined state being, moreover, rather a dangerous article in the hands of the unskilled and uninformed. The question, then, at present, rests between peroxide of hydrogen and hypochlorite of soda. The chief disadvantage which appears likely to accrue from the latter arises from the fact that, in the decomposition which ensues, chlorine is liberated, which, reacting on the silver of the print itself, and also on the sulphate of silver resulting from the traces of hyposulphite of silver, will form chloride of silver, which, darkening in the light, would effectually hasten the injury of the print from one cause, whilst protecting it from another. If the peroxide of hydrogen were pure, and it were employed with distilled water, no disadvantage to the print would be likely to accrue from its use; but as peroxide of hydrogen contains a trace of hydrochloric acid to preserve it from decomposition, and as almost all common washing waters contain chlorides, the same reactions, only perhaps slighter in degree, will take place in using the peroxide of hydrogen, and the print will probably be left with traces of chloride of silver, which, darkening, will cause the degradation of the whites in the print. Mr. Hart proposes, however, to meet the difficulty by treating the print with dilute ammonia after the hyposulphites have been oxydized. This treatment will dissolve any chloride of silver formed, and a few washings will then leave the print tolerably safe, so far, at least, as it is affected by the causes in question. As regards the efficiency of the operation, then, both agents are tolerably equal.

The question of cost becomes then the important consideration. Here the advantage is immensely in favour of hypochlorite of soda. The cost for treating a quire of paper with this agent will not exceed threepence for a quire, estimating it at the retail price. We have not made accurate quantitative experiments with peroxide of hydrogen, but it is probable that, at the present retail price, the cost would be nearly as much per sheet as the hypochlorite costs per quire.

The test which Mr. Hart proposes for the complete elimination of the hyposulphite of soda is very delicate, and is presented in a very available form. He uses the test-papers prepared with iodide of potassium and starch, similar to those used in testing for the presence of ozone. These papers, immersed in a solution containing the most infinitesimal trace of chlorine, are coloured blue, the iodide of potassium being decomposed, and iodine set at liberty, which it is well known produces a blue tint in contact with starch. The test-paper with the minute trace of free iodine present is immersed in the last washing water of the print. If hyposulphite of soda be present in the minutest quantity, the iodine in the test-paper is dissolved, and the colour is discharged from the paper. The print is now immersed in a solution of hypochlorite of soda for a short time, rinsed, and a fresh piece of test-paper, coloured blue by contact with the hypochloride solution, is immersed in the water. It is now found that the colour is not discharged, as there is no hyposulphite of soda present to dissolve the trace of free iodine, and the sulphate of soda formed has no effect on it. It will be seen that this test-paper furnishes a very simple and elegant mode of applying the iodine test for the presence of hyposulphite of soda,* and of ascertaining when the action of an oxydizing agent is complete.

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* Of the delicacy of this test, it will furnish some idea if we state that a liquid containing 1·450,000th of its weight of iodine will colour the starch test-paper blue, and that twice its weight of hyposulphite of soda wil lremove that colour.

Mr. Hart, on the first occasion on which he proposed to oxydize the hyposulphites, also added a soluble barium salt, nitrate or chloride, by the presence of which an insoluble sulphate of baryta was formed. So far as we see at present, however, it complicates the operation without adding to the stability of the prints. There is no doubt that such amount of fading as was due to the presence of traces of hyposulphite of soda and hyposulphite of silver left in the print after washing may now be removed, and by means at once inexpensive and easy of application. This method, in conjunction with the carbonate of ammonia recommended by Mr. Spiller for preventing decomposition in the fixing bath, and removing as much as possible of silver from the whites, will, it is probable, in careful hands, give a considerably increased tenure of permanency to silver prints.

PHOTOGRAPHING NON-ACTINIC COLOURS.

BY NELSON K. CHERRILL.

All photographers are aware of the difficulties presented to them in their attempts to photograph the non-actinic colours of the landscape,—the yellow green of the spring foliage, or the splendid hues of the moss-grown rock.

The use of a yellow glass screen to the lens has been proposed as a remedy; but while, doubtless, right in theory, this method would be attended with considerable difficulty in practice. Many different shades of glass would be required, and it would also be found necessary to use the thinnest possible specimens, which would be found very liable to fracture.

I have to propose to your readers a method which I have been using myself with considerable success, by means of which, as far as my experience goes, any exposure may be given without clogging up the high lights.

It is hardly necessary to explain that the real difficulty presented by the yellow foliage is—not that the details will not come out under any exposure—but, that a sufficient exposure having been given, other parts of the picture are lost, either from the clogging I mentioned before, or from over intensity.

In considering this subject, I was led to observe that the result is produced by the violence of the developing action set up on those parts of the plate which have been exposed too long. I have also observed, that if an extra supply of silver is given to the developer, it will be deposited more in proportion on the high lights than on the darker portions of the picture. From this I concluded that if in the first development we used much *less* silver than exists on the plate, we should be able to use a very much longer exposure without fear of clogging or over intensity.

The quantity of solution used for the development of the plate will, of course, affect the intensity in some degree, but it will be found in practice impossible to wash off enough silver to compensate for even a moderate increase in the time of exposure.

The method, then, which I adopt is, to add a small proportion of free iodine to the developer (from one to fifteen minims of a ten-grain alcoholic solution). The effect of this solution is very simple; the iodine forms iodide of silver with some of the nitrate of the plate, and so reduces the intensity of the image and the violence of the development in proportion to the amount present.

The iodide of silver formed by the iodine developer is seen floating about on the plate, and being of course in the dark tent or room, the little flakes are not acted upon by the light, and so remain to the end of the development of their yellow colour. They are removed from the film, to which they do not adhere, by the first application of water. I have not found that the presence of these flakes of unaltered iodide interfere in any way with the development of the image.

In conclusion, I must observe, that I only offer this as a suggestion, one which may probably be more fully worked out by others. The matter has now been many months in my note-book. My first experiments were conducted with a solution containing iodide of potassium, &c., as well as iodine. I find, however, that the iodine alone does just as well.

If at any time it may prove an advantage to double, or even treble the exposure of a wet plate, without obtaining too much intensity in the high lights, I offer the present suggestion for the use of iodine as a means whereby I have been able to produce the desired effect.

I have tried it a great many times, and have taken many good negatives by its means, of subjects which I do not think I could have done without its aid; at least, I do not think I could have obtained so good results any other way.

I have used iodine both with and without organic stuffs in the developer. For obvious reasons, a little less acetic acid should be used when iodine is present in the developer.

[A specimen print, with deep foliage, running water, a bridge and white boulders, all rendered with exquisite delicacy, testify to the practical efficiency of the recommendation.—Ed.]

ON THE ELIMINATION OF THE DOUBLE HYPOSULPHITES OF SODA AND SILVER FROM PHOTOGRAPHIC PRINTS.

BY F. W. HART.*

Early in February, 1864, I brought before the members of this Society a method for converting the hyposulphites of soda and silver (as habitually left in photographic prints), into more stable and insoluble compounds, hoping thus to render our present beautiful gold and silver photographs proof against the stigma of fading.

In the outset, let us not be led away after impossibilities, for I believe the experience of the world has made it an axiom that there is no such thing as absolute permanency in the handiworks of man. Permanence, therefore, resolves itself into a matter of degree, and is to be solved only by time. And has not time caused many of our old philosophers to recant portions of their early teachings? To illustrate this, I should only have to cite the fathers of chemistry, many of whose ideas are looked upon now as absurd; nevertheless, they laid the foundation on which our Newton, Davy, and others have built our modern chemistry. The alchemists would have their contemporaries believe that gold and the sulphur of gold, as they termed it, had the power of causing all other matter in nature to be as permanent as gold itself. While we have learned to admit, without doubt, the great permanency of gold in its uncombined form, their sulphur, which they considered as an all-curing agent, is deemed by us the destroying angel. If we have seen in many instances the marvellous perfection and beauty of our photographs, which are coined direct from the atoms of nature—I say, if we have seen them fade in many instances—how much of this is to be attributed to negligence in some form or other! I will here mention an instance which occurred in my practice some years ago. Being in a locality where all the water used had to be pumped into pails, and carried to the barrel for washing the prints during the night,—being expected out of the way, I heard the boys say to each other, "It's almost always run out by the morning, and how should he know when we fill it up." Had I discovered the process which will be shown to you presently, we could have had a check against this form of negligence.

Before proceeding to experiments, it may be interesting to trace how I was led to make the experiments which give the title to this paper. Being conscious of the readiness with which liquid albumen decomposes, especially when highly diluted with water, as is the case when our paper albumenizing dishes and pans are washed out at the close of each day's work, the traces of albumen with the large quantity of water commences to decompose almost immediately. To prevent this decomposition, I made experiments to ascertain the most effectual preparation to destroy this tendency; for if these germs which were likely to form and become mixed with the fresh albumen of the next day, it would be analogous to placing tainted meat in contact with fresh, or yeast with extract of malt; wash you ever so carefully, there are little crannies almost proof against plain water. To make sure of removing and searching these out, permanganate of potass solution was tried, with the desired effect, but it left a precipitate behind, which was objectionable. Peroxide of hydrogen was tried; this I found required such an inordinate quantity to accomplish the desired end, that it would have cost me at least three shillings for each dish.

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* Read before the South London Photographic Society, June 11th.

A solution of chlorine in water was found to succeed admirably. After using it for some time, we employed the equally efficacious compound—hypochlorite of soda. It then occurred to me to try the experiments on photographic prints—the most economical and effectual I brought before your notice—and now hand round the same picture, which had been subjected to the treatment as stated at the time, viz., the ordinary routine, until the washing should have commenced, when it was cut in halves; one half was partially washed, the other allowed to retain the fixing solution; the two were then put in the chlorine solution (which, by the bye, was rather strong). That which had been slightly washed was altered in tone; the other retained its original toned appearance. The reason of the former being altered in tone was the solution being too strong, whereas that which contained the fixing solution counteracted the excessive oxydizing effect. It may be said such a process is dangerous: so is the administration of prussic acid to the human system, but the physician tries experiments and dilutes it until it becomes a positive good for the purpose intended. In my later experiments I have used the more convenient compound—hypochlorite of soda—to oxydize the hyposulphite with, and you will see, as with the physician, I am able to tell the proper amount to administer by a simple test.

We now proceed to practically illustrate the above remarks.

[Mr. Hart proceeded with the practical demonstration whilst reading the remainder of his paper.]

As gaslight is unfavourable for appreciating delicate bluish grey tints, only those near at hand will be able to see them, as applied to the preparation of the bath, in which we are about to place these imperfectly washed prints, for the elimination of their contained hyposulphites. While they are in that bath, I will exaggerate the process going on. In this tube, we place a few drops of our eliminating preparation, and fill up with water, to represent the bath in which the prints are placed. Call this No. 1. In another tube, put a drop of old fixing bath, hyposulphite of soda, and silver; this filled up with water to represent our prints: call this No. 2. Here is a piece of the test-paper with which I ascertained the proper amount of solution to put to the prints. Now mark the effect. On my dipping this into No. 1. tube, see the white paper is changed to a deep blue. Please remember that this indicates that the solution would be too strong for our prints unless they had been scarcely washed at all. Let us now dip the blue portion halfway into No. 2 tube, and, presto! the colour is gone, leaving a blue band between the white ends, that you may see the effect better by contrast. This simple experiment will always tell you if any hyposulphite exists in your prints or washing waters. A portion of solution from No. 2 being transferred to a fresh tube No. 3, we add some of our eliminating solution little by little, until the hyposulphites of soda and silver are completely oxydized into the higher forms of sulphates and chlorides. To show you this, I take a portion of No. 2 tube, and add thereto a drop of nitrate of barium solution. No precipitate is produced; while that which has been oxydized into sulphates in No. 3 gives the characteristic precipitate of sulphate of barium; and again, our test-paper, which lost its blue tint in the representative of the print-washing water, now retains its blue colour in the solution which has been rid of hyposulphites.

As I have kept in view the silver in combination with the hyposulphite, you now see that infinitesimal quantity giving a *faint* milkiness to the solution, in the form of chloride of silver, by adding a few drops of fixing solution; it is re-taken up and rendered clear again. If it is desired to remove this infinitesimal quantity—probably not the $\frac{1}{30000}$ of a grain—I propose a solution of a few drops of liquid ammonia, just to barely make the water smell of it; a rinsing in this will take up that small quantity.

We now turn to our prints. The water in which they were was seen to discharge the tint on our test-papers. We repeat the test, and it is found to retain its colour, owing to the hyposulphite having been eliminated or converted into sulphate of soda. If nitrate or chloride of barium solution is added, as formerly proposed, an insoluble and stable compound is formed, which is not acted on by sulphuretted hydrogen.

I had intended to carry this paper much further, and show you experiments on the oxydizing properties of chlorine in presence of water, acids, &c., but the recollection that there was likely to be much to get through on this our last meeting, as well as the demands of business on my time, determined me to defer it until some future meeting, should I be permitted to again open the subject; and in taking leave of you for the recess, I wish you a joyous and prosperous season.

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Recent Patents.

IMPROVEMENT IN PANORAMIC CAMERAS.

BY VICTOR ALBERT PROUT.

This is another modification in panoramic cameras. The general principle is described, in the provisional specification, as follows:—

This invention has for its object improvements in photographic cameras. Panoramic views have heretofore, in some cases, been taken by photography, the camera being adjusted first to take a portion of the view, and this being effected, it is shifted or turned partly round, and the plate or sensitive surface moved forward for the next portion of the view to be taken, and so on. Great difficulty, however, is experienced in avoiding the appearance of join lines between the different parts of the compound picture; to overcome this difficulty I employ a screen which may conveniently be placed a short distance in advance of the plate or sensitive surface; this screen, which limits the size of the portion of the picture which is taken at each operation, is so made as to shade off, as it were, the edges of each portion of the picture, spreading, so to speak, the join lines between the several portions of the picture over a surface of some width instead of allowing the join to take place at a line of inappreciable width. This I do conveniently by making the sides of the screen of zig-zag form, like saw-teeth, and these are so arranged that the points at the one side correspond to the centre of the notches on the other side. It will be seen that these teeth act by intercepting a part of the light from the portion of the plate or sensitive surface opposite which they come, whilst the portion so shaded is twice exposed, first at one side and then at the other of the screen. The distance between the sides of the screen are made adjustable, so that in case there are in the view any long horizontal lines, as in architectural objects, such lines may be taken from end to end at one operation, otherwise they would show angles at the joins. The same adjustment also serves to fit the instrument to work with lenses of different apertures. In taking panoramic views, the slides for containing the plate or sensitive surface are necessarily of considerable length, and, as at present, made with a rigid shutter and with a rigid screen board on the camera, the whole arrangement is somewhat unwieldy; to obviate this, I apply flexible shutters to the slide, so arranged that as the leading edge of the slide is pushed forward into the camera, it becomes uncovered, and before it emerges on the other side it is again covered and effectually shielded from the light.

According to the arrangement I prefer, two flexible sliding shutters are employed, and they work in guide grooves on the slide. When the slide, with its plate or sensitive surface, is ready to be put into the camera, the two shutters meet at the leading end of the slide at the front of it; one shutter is then in front of the plate or sensitive surface, whilst the other is behind the back of the slide. As the slide is pushed forward into the camera, a stud on the front shutter catches a projection or stop on the camera, and the shutter is thus pushed back, and it travels round a pulley or guide at the rear end of the slide, and passes to the back. Before the leading end of the slide emerges from the camera, a stud on the other shutter catches a projection or stop at the further side of the camera, and the shutter is thus drawn from the back of the slide round a pulley or guide at the leading end of the slide, so as to come in front of the plate or sensitive surface, and protect it from the light. In taking photographic pictures, difficulty is experienced in obtaining an accurate representation of the sky at the same time that a foreground is taken, as, unless special precautions are taken, the sky will be over-exposed before the objects in the foreground will appear. To obviate this difficulty, I employ an adjustable screen by which the light of the sky may be in great part intercepted; this screen conveniently is placed at the lower part of the camera and some distance in front of the plate or sensitive surface; its upper edge is arranged to intercept very little light, but it becomes gradually more opaque in descending from the edge. I prefer to make this screen of wires placed horizontally, and held together so as to make a flexible fabric at the upper edge of the screen; the wires are fine and far apart, but in passing down the screen they are placed progressively nearer and nearer together until any desired degree of opacity is obtained; the wires may also, if desired, become gradually coarser in passing down the screen. In using the instrument when it has been adjusted to take a view, by turning a button, or otherwise, the screen is brought up until the sky is shaded to the extent the operator considers suitable.

In order to insure the exposure of the plate or sensitive surface for the exact time the operator determines to be suitable, a clockwork apparatus is employed; this clockwork gives motion to a disc in which holes are bored, and a peg entering one of these holes holds the clockwork stationary, until the time at which it is desired that it should start into motion, viz., when the exposure commences; this peg is in connection with a lever, which, when acted upon by means of another lever, or otherwise, gives motion to a stop so arranged that when the peg is in a hole in the disc, the stop is in such a position as to exclude light from the camera. When the operator wishes to commence the exposure, he touches the lever to which the peg is connected, and so withdraws the peg from the hole in the disc; thus he both starts the clockwork and moves the stop so as to admit light to the camera; a spring causes the peg to bear constantly on the surface of the disc, and when this has revolved so as to bring up another hole, the peg drops into it, the clockwork is stopped, and the light again excluded from the camera by the stop. Any desired time of exposure can be obtained by having different distances between the holes, and selecting a suitable hole to put the peg into at the commencement of the operation.

The complete specification enters into more detail, and is illustrated with diagrams.

OXIDE OF MAGNESIUM LIGHT.

BY PROSPERO CARLEVARIS.

This invention received provisional protection only. It is described as follows:—

The process whereby this light can be obtained is founded upon the following scientific principles:—

1. The infusibility of oxide of magnesium at the very highest temperature.

2. The property that the said oxide has of being volatilized but in the smallest quantity, in a flame of oxygen and hydrogen mixed together, and without imparting any colour to that flame.

3. The property that the same oxide has of spreading, on being placed within the flame of the said combination of gases, an intense, bright, and constant light, and which is admirably suitable to photography and general illumination.

4. The property that many magnesian salts, and particularly chloride of magnesium and carbonate of magnesia, have of leaving, on being decomposed at such high temperature as is produced by burning together oxygen and hydrogen gases, some oxide of spongy magnesium.

Starting from these principles to obtain the light spoken of, the process is as follows:—A piece of chloride of magnesium, larger or smaller, according to the effects of light required, is placed upon a small prism of gas-retort coal, and upon it, through a small tube purposely made, the flame of the oxy-hydrogen gas (the mixture of oxygen and hydrogen) is directed; or a prism, or even a small and well-compressed cylinder of carbonate of magnesia, is placed within the flame from the same mixed gases. The chloride of magnesium or the carbonate of magnesia is directly decomposed and resolved into oxide of spongy magnesium, from which the intense, bright, fixed, and constant light comes forth, causing all the chemical phenomena of diffused sunlight.

The gases of the said combination, which are pure hydrogen, or even ordinary illumination gas, and pure oxygen, or even atmospherical air, flow separately from two different gasometers, and are mixed only in a very small tube at the end of the pipes. They can be prepared in the ordinary way when wanted in small quantities; if wanted in a large scale, pure hydrogen is prepared by causing steam to pass over incandescent charcoal. Oxygen is prepared with manganese and hypochlorite of lime with manganese and silicic acid, or with dry sulphate of iron, the products of whose decomposition are caused to pass upon platinated pumicestone, turning to profit the sulphurous acid resulting from the process to the preparation of sulphites.

My invention, therefore, consists in producing a light by placing the oxide of spongy magnesium in a flame produced by a mixture of oxygen and hydrogen.

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THE TANNIN PROCESS.

BY J. H. RITCHIE.*

The reasons which have induced me to write the following paper are: in the first place, I have not as yet attempted to make any return for the pleasure and instruction I have derived from hearing papers on various subjects read by the members of our Society, and now wish to add my mite, although I fear for all but our photographic members it may be rather too *dry*; in the next place, when so many objections are (I think without cause) brought against the tannin process, it appears to be only fair that those who think well of it, and hope to see it perfected ere long, should say so, and try to remove what difficulties they can.

Although I cannot pretend to any discovery on this subject, perhaps a description of the causes and cures of some of the failures I have met with may be useful to others.

The formulæ which I have followed are, with very slight variations, those described in Major Russell's little treatise; but nevertheless it will be as well to recapitulate them.

Cleaning the Glass.—As I have observed some defects arise from minute points, if the glass be insufficiently or improperly cleaned, especially if it had been previously used, after removing the old film in a cold solution of carbonate of soda and rinsing, I soak the plates for, say, twenty-four hours in about equal parts of nitric acid and water, rinse, neutralize any remaining acid with a fresh solution of carbonate of soda, rinse, and drain dry; and when wanted, I polish them with a little tripoli and ammonia, wipe off, drop a few drops alcohol and water, and polish till dry with a rubber made of felt fastened on a cork bung, and finish with a second similar rubber.

India-rubber Solution.—The edges, for about one-eighth of an inch, are brushed over with a solution of india-rubber in benzole, one grain per ounce. I find this, with the collodion I use, quite sufficient to prevent the film from moving, and the plate, not being covered with the solution, is free from opaque streaks, which I found apt to form when flowing the india-rubber over the plate.

The Collodion is bromized, being of the following proportions:—5½ to 6 grains pyroxyline, 7 grains bromide of cadmium, 5 grains bromide of ammonium, 3⅞ drachms ether, 4⅛ drachms alcohol of 808 sp. gr. The pyroxyline with which this was made was prepared exactly as Major Russell describes in his book, and proved very soluble, making a collodion which, if anything, sets rather too fast, especially in hot weather, but still not at all contractile nor apt to leave the glass, although it has a peculiarity which I shall refer to presently.

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* Read before the West Kent Natural History, Microscopic, and Photographic Society.

The Bath is of the strength of 70 grains per ounce, and should not be allowed to fall much below this strength, for if so, streaky marks form on the lower edge of the film; and there are other defects which I shall mention further on. The coated plate is immersed in the bath just when the lower corner retains the impression of the finger, and remains in the bath until it is quite creamy, which occupies, according to the heat of the weather, from ten to twenty minutes.

Washing.—On removing from the bath, it passes through two vessels containing clean rain-water, and after pouring, say, a pint of common hard water over it, carefully, but with some force, it is placed to soak in hard water for an hour or so. I use for this purpose an ordinary foot-pan, in which is a wooden rack which supports eight 8½ by 6½ plates, or sixteen 5 by 4, or other small plates; on removal from this, some clean rain-water is poured over the back and front of the plates, and they are waved about a little while in a tray containing a little distilled water, previous to putting in the tannin, as it seems very important not to leave any hard water on them to mix with the tannin, as, if so, streaky marks form round the two sides of the lower corner of the plate when drying.

Tannin is of the strength of 15 grains per ounce with, say, one-tenth alcohol added. I use it over and over, and think it is quite as good old as new, if filtered before each occasion of using. The plates are laid in it, face up, in a porcelain tray, and after waving the solution about a little over them, they rest in it for about five minutes; they are then taken out and set up on their corners to drain and dry spontaneously, with their faces inwards.

The Exposure is about one-half to three-quarters longer than would be required for a wet plate for iron development. The keeping qualities of the plates are very good; to illustrate which, I have here four out of a dozen, prepared last November, which were exposed two days ago; and at the same time, to show they are not much affected by greatly prolonged exposure, one was exposed 20 seconds, one 50, and one 60 seconds, the lens being a Ross's orthoscopic, with full aperture.

Development.—A little alcohol and water is poured over the film to moisten it, returned to the bottle, then some water in a developing cup is poured on and off till the greasy marks disappear. The developer, which is a mixture of carbonate of ammonia and pyrogallic acid, is kept as follows:—Both the carbonate of ammonia and the pyrogallic acid are kept in solution, of the strength of 24 grains per ounce, the carbonate of ammonia being in water and having three-quarters of a grain per ounce bromide of, say, potassium added; this solution is ten times as strong as it should be used, but it is easily diluted. When required, the pyrogallic acid is in absolute alcohol, in which it keeps for any time. To develop the picture, a little of the carbonate of ammonia solution, diluted as above mentioned, is mixed with a few drops of the alcoholic solution of pyrogallic acid, and flowed over the plate, when the picture at once comes out, and by adding a few drops, drop by drop, of the strong carbonate of ammonia solution, the picture generally becomes sufficiently intense; but if it does not intensify, which is sometimes the case, the alkaline developer should be carefully washed off, and the intensification continued with pyrogallic acid, citric acid, and silver.

All the above-described washings may appear very troublesome, but after the various baths and trays are got and kept clean there is little further trouble, as the plates pass in succession through them faster than I have described it; and it appears to me quite as simple as a process where a less number of operations, but a greater number of solutions, are necessary, washings with water being the principal operations in this one.

I will now say a few words about the failures which I have met with. At first, when I tried this process, I found a part or the whole plate fog over on applying the alkaline developer. The more it had been washed the worse it was; and it was not till Major Russell found that there must be a certain quantity of free bromide in the film to keep it clear, that I got over this; but now, by adding, as above-described, three-quarters of a grain to the stock solution of carbonate of ammonia solution, I never see such a thing as fogging. More bromide should not be used, as it would greatly retard the development.

I was very much tormented for a long time with clear insensitive spots with black nuclei, but have not seen one (although using the glass over and over) since I have cleaned the glass as above described. I was also much troubled at one time with another kind of spot. It was much larger than the others, had soft edges, and no nucleus; and appeared to grow larger the longer the plate was kept before use. I was then washing off the tannin before drying, but on discontinuing that practice, I saw no more of these soft spots, nor insensitive corners of the plate which often accompanied them; and on carefully comparing the relative sensitiveness of plates with the tannin on and off, I could not perceive the slightest difference. This difference from others' experience is due, I have no doubt, to the collodion being of a description which did not bear the tannin being washed off. Of this I shall have more to say further on.

When drying the plates in a common draining-stand, I found clear marks formed in the film when dry, near the points of support. These do not appear when drying standing on the corner.

There is a defect to which some have found tannin plates liable, about which there has been a good deal of discussion, which Major Russell calls blurring. I have never seen it (except perhaps in the most minute degree) on plates prepared with the above-mentioned collodion; but have seen it to a small extent on some prepared with a more powdery collodion, from which it may be inferred that the condition of the film has something to do with it. I mention this for the purpose of referring to some experiments which may have some bearing on this subject, which I will describe as shortly as possible. Some time ago, when trying whether any organic impurity, removable from the bath with animal charcoal, was the cause of spots, I found, on immersing the plates in the bath, that the bromide of silver at once formed, and immediately slipped off, leaving the collodion film transparent. This I at the time attributed to some peculiar effect of the charcoal on the bath; but Major Russell, to whom I mentioned it, told me that he thought it was merely due to the bath being much weakened. This proved to be the case, for on making a weak bath, the same result followed. With the above described collodion, I found that a 32-grain bath caused slight slipping, a 22-grain bath more, and a 15-grain bath complete and immediate slipping. I then tried whether it was the same with the other collodion, which had shown signs of blurring, but found that in the weakest bath it hardly slipped at all; in fact, it did not slip of itself, but could be partly washed off from the collodion film with a strong stream of water. It then occurred to me to try whether the remaining film was deprived of all its salts, so I washed and dried these films, and after remaking into collodion with ether and alcohol, I coated a plate with it; but there was not the slightest bromide of silver formed on immersing in the bath, showing that the whole of the bromides had been, so to speak, sucked out of the film by the weak bath. Whether or not the action is at all similar in the case of a strong bath, I cannot say; but if so, the collodion not showing blurring would have its sensitive film on the surface, whereas the one showing blurring would have its sensitiveness more distributed through the film. This, perhaps, may be one clue to the cause of blurring in some cases and not in others, and it might be useful to try how the collodion behaves in a very weak bath for this purpose, and also as an indication whether the tannin should be left on or washed off; for if the sensitive part is all on the surface, of course it will not bear to have the tannin washed off; but if it is in the film, probably washing off would only remove the excess of tannin, and leave sufficient in the film.

There is another experiment which I wish to allude to, as it is very curious, although not apparently having any great importance. It is this: I was trying whether it were practicable to apply the tannin before the collodion, by first coating the glass with gelatine, drying, flowing over with a solution of tannin, drying, coating with collodion, immersing in the bath, &c.; this did not yield great results, although I got some pictures with it, and the bath was not so much injured by it as I supposed it would be; however, I mention it to speak of a curious phenomenon which I noticed. When the plate, tanninised and coated with collodion, was immersed in a neutral bath, no bromide of silver whatever formed; but on putting the same plate aside till I had added a drop of nitric acid to the bath, and re-immersing it, the bromide of silver at once began to form. I should be glad if any one present could give me an idea of the reason of this.

In conclusion, allow me to say that I think, if any one will give the process a fair trial, keeping the above hints, among others, in view, he will be certain not to meet with great failures, which, unaccountably to me,* some have met with in this process, and will very soon be able to produce pictures little, if any, inferior to the best wet ones.

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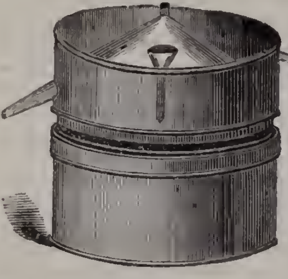
IMPROVED APPARATUS FOR DISTILLING WATER.



There is probably nothing more dependent upon cleanliness and careful manipulation than photography. To secure good results, the utmost cleanliness is necessary, and each chemical used should be of the purest and the best. Even the water used for the nitrate bath and silvering solution should be clean and pure. More troubles arise from the use of bad water than most photographers imagine, and the difficulty of obtaining pure or distilled water has made many an aspiring *confrère* despair of making first-class work.

This need be no longer so. By the simple apparatus of which we present a figure above, the photographer may distil water in any quantity, and as he desires it for use.

It consists of a boiler, surmounted by a condenser, which supersedes the use of the old-fashioned worm, and for cheapness and economy in using, is deemed the best for the purpose.

Its construction is so simple that it involves no trouble or delay in its adjustment, and it may be used in connection with a stove, charcoal, or gas furnace.

The water to be distilled is placed in the boiler, and where the boiler and condenser are fitted together, there is a narrow space to be filled with water, for the purpose of forming a water-joint between the two. The steam arises to the top of the cone-shaped condenser, and being condensed by the cold water poured upon the top through the funnel, trickles down the inside, is caught in a receptacle below, and flows into a bottle by means of the long nose at the side. As the cold water is frequently poured in through the funnel, the heated water rises and flows out through the short nose at the right of the still (see cut). The orifice at the top of the condenser must be kept tightly corked. Where ice is plentiful, it may be used on the top of the condenser, which will obviate the trouble of continually changing the water. They are now ready for the market, we learn, and may be had of your stockdealer. They are made to distil one, three, or six gallons.—*Philadelphia Photographer.*

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CHLORIDE OF CALCIUM.

BY PROF. TOWLER.*

This compound is now frequently used by photographers in the preparation of collodio-chloride, but it cannot always be easily obtained at the druggist's; we therefore deem it our duty to teach our readers how it may be easily prepared by themselves in case of need.

Procure an ounce of hydrochloric acid and a lump of chalk. Powder the chalk, and then add it gradually to the acid, stirring the mixture between each addition so as to break up the bubbles produced by the effervescence. As soon as the effervescence ceases entirely, and the colour changes from a yellow or straw to that of common water, and there is still a small quantity of chalk at the bottom of the glass, separate the clear liquid by decantation, or, better still, by filtration through blotting-paper, and then evaporate the liquid to a syrupy consistence. When it arrives at this stage, it is set aside to cool, when it concretes into a crystalline mass. In this condition it contains two equivalents of water, its formula being $Ca, Cl, 2\,HO$. If kept in a closely stoppered bottle, it may be preserved in this form and condition for an indefinite time; but if exposed to the atmosphere, it attracts moisture and deliquesces. If the salt be evaporated to dryness, the two equivalents of water are driven away, and a dry concrete mass is the result. The formula of this dry compound then will be Ca, Cl. Owing to the property which chloride of calcium possesses of attracting moisture from contiguous or neighbouring objects, it is very frequently used in the dry and fused state to separate water from alcohol, ether, and other chemical substances containing water. One part of water at a temperature of 32° Fah. will dissolve about two parts of this salt; whilst at a temperature of twice this degree it will dissolve twice the amount. Boiling water dissolves a very large quantity of this salt. It is very soluble also in alcohol; and at a low temperature the salt crystallizes and contains alcohol instead of water of crystallization.

Chloride of calcium is quite a distinct substance from what is denominated chloride of lime. The latter, if it be a chemical compound, is hypochlorite of lime; the substance is probably a mixture of hypochlorite with chlorinetted lime, and is formed by passing chlorine into chambers containing slacked lime, which absorbs it to the amount of from 30 to 40 per cent. This chlorinetted white powder is partially soluble in water, forming a solution denominated bleaching liquor. The chlorine is easily separated from the powder by means of a weak acid; thus the bleaching liquor may be coloured blue by litmus, green by red cabbage, or brown by turmeric, the two latter colours showing the alkaline reaction of the liquor, which shows that the chlorine has been set free.

To the fact that chlorine is thus easily liberated from its combination with lime may be attributed, probably, the advantage of adding a little of this substance to the gold toning bath; but the photographer must guard against adding too much, otherwise the toning bath will have a tendency to bleach the prints.

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* It is due to Mr. Ritchie to state that, unlike many others, he produces really fine pictures by the process, as those who saw his specimens at the recent soirée can testify.—Ed.

* *Humphrey's Journal.*

Both these salts—that is, chloride of calcium and chloride of lime (hypochlorite of lime)—are employed in the preparation of the gold toning solution. The following formulas produce solutions that yield excellent results:—

Chloride of Lime and Terchloride of Gold.

Terchloride of gold... ...	3 grains
Chloride of lime	2 „
Water	20 ounces.

The chlorine is not liberated instantaneously; the solution, therefore, has to stand for a day or two before it is ready for use. Furthermore, previously to introducing the chloride of lime, the solution of gold, if acid, must be neutralized with chalk. By using hot water, instead of cold, the bath is sooner ready for use; in fact, as soon as it is cold the prints may be introduced. This bath produces rich black tones.

Chloride of Calcium and Terchloride of Gold.

No. 1.—Terchloride of gold... ...	2 grains
Water	4 drachms.

Add lime-water to this solution until it is neutral.

No. 2.—Chloride of calcium... ...	16 grains
Water	10 ounces.

Mix the two solutions and add water to make up a pint. This is Mr. Heisch's formula.

By neutralizing an acid solution of terchloride of gold with either lime-water or carbonate of lime, we form the double salt of chloride of gold and calcium, and thus introduce a sufficient quantity of the latter base. When photographers prepare their own gold salt, this is the easiest plan of preparing the bath, namely, by first simply evaporating the gold solution to dryness by evaporation, and then adding lime-water to the solution of the gold until it just turns red litmus paper blue. Whose formula is this? Ours, we believe; still you may own it if you like. It is an excellent formula.

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A THEORY OF PHOTOGRAPHY.

BY M. CAREY LEA.*

I have, for a long time past, been engaged in an earnest effort to do what I could towards placing the theory of photography upon a definite and stable basis, and the result of my experiments I have, to a considerable extent, placed before the public. A few material ones remain to be described, but my principal object at present is to show that all these results can be grouped into a harmonious whole, and what will perhaps tend to render this view of theoretical photography acceptable is, that it to a great extent reconciles the various views entertained by the most thoughtful photographers of the day, and shows that they are only apparently and not really incompatible with each other; that, in fact, it only requires a few generalizations to prove that the differences of opinion depend, to a large extent, upon differences of condition; that behind these stand general principles upon which all can unite without the abandonment (except in one or two instances) of opinions at present entertained.

The theory which I propose may be summed up in the following propositions:—

1. Pure iodide of silver is always sensitive to light.
2. When isolated, it is never decomposed by light, but undergoes a merely physical or molecular change.
3. But when exposed in the presence of free nitrate of silver, it undergoes, with time, a distinct and abundant reduction.
4. This reduction is to a sub-iodide, and not, as supposed by some, to metallic silver.

From these propositions there result the following important corollaries:—

1. The image on pure iodide of silver, isolated, is *single.*
2. That an iodide of silver moistened with solution of nitrate of silver may be, and, probably, generally is, *double*; that is, it consists of a physical image impressed upon particles of iodide, and they may also be a reduced image due to the nitrate of silver.
3. Where an organic film is present, containing the iodide, and the whole is moistened with nitrate of silver, the image may be *triple*; it may consist of the two former, with the addition of a third due to the organic matter, as exemplified in my experiments of removal of the iodide by solvents, and production of a picture, independently of the iodide.

It also results from the foregoing that the physical theory is pre-eminently the true one, because those holding that opinion have never denied that the silver haloids were, under favourable circumstances, reducible by light, and our view that a developable image may be produced, independently of any reduction or decomposition, is one that has been placed beyond controversy.

I now proceed to the proofs of the foregoing propositions. Part rests upon experiments already published; those I shall simply refer to. Part upon new experiments, which I shall state a little more fully.

The first of my propositions is, I believe, now generally admitted. The second, that no reduction accompanies the production of the latent image upon pure iodide of silver, is demonstrable in several ways. First, by experiments already published, in which it was shown that exposed plates recovered their sensitiveness by simple repose in the dark. This position is also strengthened by the following experiment, not hitherto published:—

Iodide of silver was precipitated with perfectly pure iodide of ammonium, so that it was perfectly free from chloride or bromide, a fact which was ascertained with the utmost care. Nitrate of silver was present in excess, after which the precipitate was carefully washed, and then allowed to stand under liquid ammonia for some days in the dark. The ammonia was then washed thoroughly out, and with it any possible traces of bromide or chloride, and the iodide was placed at a southern window. It rapidly darkened to a greyish colour. This darkening reached to only a pale greyish shade, and then stopped entirely, nor did any amount of exposure increase it. The vessel was left in the bright light and occasional sun for the whole day, with frequent stirring to bring up new portions to the light. It was kept moist during the whole exposure.

The water was poured off and replaced by nitric acid, in contact with which it was left for a day or two. By this treatment it perfectly recovered its lemon yellow shade. But the nitric acid had taken up no silver; not a trace could be detected in it. This is very significant, for two reasons. First, because, as I have lately shown, even very weak nitric acid entirely destroys a latent image; and second, in that I have also shown that when sub-iodide of silver is treated with nitric acid, it is resolved into metallic silver, which dissolves, and neutral iodide, which remains; a further confirmation of which will be found further on. It therefore follows that no reduction (even to sub-iodide) took place when the iodide was exposed to the light, or else silver would have been dissolved out by the nitric acid, and would have been detected in it.

I now pass to the next experiment, which was directed to the ascertaining decisively that reduction took place when pure iodide of silver was exposed to light in the presence of free nitrate of silver.

A portion of the same perfectly pure iodide was placed in a porcelain basin, and covered with a solution of nitrate.

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* *Philadelphia Photographer.*

It was exposed beside the other for the same period of time. It darkened a good deal, assuming a greenish grey colour, but without any approach to black, or, indeed, any great depth of tone. It was frequently agitated and stirred. Finally, it was well washed, to remove all the soluble silver salt. It was next left standing for thirty-six hours under a strong solution of hyposulphite of soda, to remove all undecomposed iodide. A greyish powder remained, and it is worthy of observation that this powder was much lighter in colour than before treatment with the hyposulphite, so that the darkening seemed rather to depend upon a change of colour in the undecomposed iodide than upon the reduction.

The next step was to decide what was the nature of the substance which resisted the action of the hyposulphite. Was it metallic silver or sub-iodide? When sub-iodide is treated with nitric acid, as before mentioned, it does not dissolve entirely, as silver does, but leaves a residue of bright yellow iodide, very different in appearance and less in bulk than the original substance before the action of the nitric acid. In the present case, this yellow residue was left, showing clearly that the reduction which had taken place was to sub-iodide, and not to metallic silver.

Any one who considers these results in juxtaposition with each other, cannot fail, I think, to perceive that although the action of simple nitrate of silver is not to be confounded with that of a developer, yet there is not wanting a certain amount of analogy. Iodide of silver, isolated, receives only a physical impression; but if free nitrate of silver be present, the physically impressed iodide has the faculty of attracting to itself silver, and sharing with it its iodine.

Whether any, and if so, how much, of this action takes place in the camera, it is very difficult, perhaps impossible, to say. Iodide of silver by itself is fully capable of forming a developable image, purely physical, but it is certainly possible that that latent physical image may, when nitrate of silver is present, instantly react upon it with production of sub-iodide.

I conclude, therefore—and this view, I believe, has never before been suggested—that a physical image is first produced by the action of light; that when the iodide is pure, the action stops there, but that when free nitrate of silver is present, the latent image formed by the light (and not the light itself directly) reacts upon the nitrate of silver, so that each atom of neutral iodide acted upon gives rise to the formation of two atoms of sub-iodide.

And I add this further suggestion, which is also new, and which I also believe to be probable, that even where this reduction takes place, it is probably not the fact of reduction that gives the power of development, but a molecular influence, a physical impression of light, upon the sub-iodide. In other words, it seems to me exceedingly probable that a plate of sub-iodide of silver prepared in the dark, and exposed in the camera, would prove sensitive to light. According to the reduction or chemical theory, this would be impossible; such a plate would fog all over.

Whether or not this last suggestion be true, I have had no time to verify; and even were it not so, it would be no objection to the general view here expressed.

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Proceedings of Societies.

South London Photographic Association.

The Annual Meeting of this Society was held in the City of London College, on the evening of Thursday, June 14th, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a former meeting were read and confirmed, after which the Secretary read the following

Annual Report.

Your Committee, in submitting their annual report to the members, have great pleasure in congratulating them upon the progress and success of the Society, both in the increase of members and in the interest which has attended the meetings during the past session. The full attendances which have characterised the late meetings are very satisfactory.

The Society is indebted to the following gentlemen for papers during the past year:—

Mr. V. Blanchard: "On the Importance of Art-Culture to Photographers."

Mr. J. Traill Taylor: "Historical Notes on Photography in Natural Colours."

Mr. H. Cooper, Jun.: "On Gelatine in the Printing Bath."

Mr. J. Werge: "On Errors in Pictorial Backgrounds."

Mr. Wallis: "On Elementary Art in Relation to Photography."

Mr. A. H. Wall: "On Matters of Fact *versus* Truth in Art."

Mr. Sebastian Davis: "On Dry Processes and their Recent Modifications."

Mr. Bullock: "On Photolithography."

Mr. Cocking: "On the Particular Kind of Art-Study to which Photographers should give their Attention."

The following gentlemen have assisted to promote our information on photographic matters, by submitting specimens and apparatus for the members' inspection, viz.:—Messrs. Taylor, Fitch, Simpson, Leake, Wall, Howard, Hart, Cooper, Dallmeyer, How, Ross, Blanchard, Robinson, Bullock, and Cox.

In reviewing the past year, your Committee feel that the great progress made in the carbon printing processes is a subject for congratulation. The fine example they have been able to secure for a presentation print will, they trust, meet with the members' approval. The Society is much indebted to Mr. Blanchard and Mr. Swan for their kindness in assisting your Committee to obtain this fine example.

Your Society is also much indebted to Mr. How for his kindness in allowing the Committee to meet at his warehouse.

The Treasurer will submit his report to you of the state of the Society's finances.

In conclusion, your Committee beg to urge upon the members the necessity for increased exertion in promoting the success of the Society, by providing papers and matters of interest for the mutual improvement and advantage of the members during the next session.

The Treasurer's account showed a balance of £20 8s. 1d.

The Chairman congratulated the Society on its prosperous condition, and put the report to the meeting for adoption, which was done unanimously.

Mr. Wharton Simpson, at the request of the Chairman, explained the reason the presentation prints were not ready. He had recently seen them in Messrs. Mawson and Swan's carbon printing establishment, but Mr. Swan, conceiving that a tone different to that originally selected would do the most justice to the picture, had resolved to print them again before sending them to the Society.

On proceeding to the election of officers, the President, Vice-Presidents, Treasurer, and Secretary were re-elected. The following gentlemen were elected to form the Committee for the ensuing year:—Messrs. Blanchard, Cooper, Foxlee, Harman, Hart, How, Cocking, Bockett.

The Chairman called attention to some fine photographs of microscopic objects, by Dr. Woodward, of the United States army, exhibited by Mr. How; and to some specimens by Mr. Foxlee, taken with Ross's rapid card lens; also to some specimens of the work of the new lens, made by Mr. Dallmeyer, including an angle of 105°, with perfectly straight lines.

The Secretary read a note from Mr. Dallmeyer, as follows:—

"19, Bloomsbury Square, London, June 14th, 1866.

"Sir,—Unable to attend your meeting this evening, I beg to hand you, by bearer, two 12 by 10 prints, from the first trial-negative taken by a new wide-angle, non-distorting, compound lens, of 7-inch equivalent focus, just completed by me, thinking that it might be of interest to members; the more so, that I first mentioned, at one of your meetings in January last, that I was then engaged upon the construction of such a lens, when I remarked upon the origin and probable uses of such an instrument.

"The lens producing the pictures I send is the result of protracted investigations, and, I believe, embraces a larger angle, with a proportionately larger aperture, than any non-distorting combination view lens extant, the aperture of the largest stop being one-fifteenth of the equivalent focal length of the lens, and the smallest one-fortieth.

"You will perceive, by the pictures sent, measuring 12 by 10 inches, that they are sharp up to the corner; the illumination also being very nearly equal throughout, the time of exposure being less than with the triple lens, using the same apertures for both. I have added a picture taken with the latter (No. 1), from the same spot, to enable you the better to compare results.

"As regards 'flare,' or central spot—existing, more or less, in all compound lenses with which I am acquainted—the subject has received my most careful attention, and I believe the new lens to be *entirely* free from this defect.

"As to brilliancy of images, of course all multiple combinations must necessarily be inferior to a properly constructed single one, and therefore, for pure landscape photography, I believe the wide angle single combination will receive the preference.

"On a future occasion I shall have the pleasure to read a paper on the subject.

"I will only add, now, that as regards construction, the lens is extremely simple, and is therefore inexpensive. This will at once be obvious, when I mention that the lens with which the 12 by 10 pictures were taken is only 1¼ inch diameter.

"The accompanying letter from Mr. England, who kindly tried the lens, may be of interest to members; I therefore enclose it, and remain, sir, your obedient servant,

"J. H. Dallmeyer."

"7 St. James's Square, June 12th, 1866.

"Dear Sir,—In answer to your inquiry respecting the new lens, I have the pleasure to inform you that it is perfectly satisfactory in every respect.

"I was prepared to find something new, but did not imagine that a lens of such short focus and simple construction could be made to do so much.

"You will see by the prints I send you that it covers a 12 by 10 plate perfectly, and microscopically sharp in detail in every part. For panoramic pictures, I have no doubt that 15 or 16 inches in length by 8 or 9 in breadth could be covered even up to the edge, thus embracing an angle of more than 100°. But I am inclined to think that its principal use to photographers will be in taking architectural subjects, both interiors and exteriors; and giving, as it does, such perfectly straight lines and good definition, it will be invaluable for working in confined situations, where only near views can be obtained of a building.

"I do not for a moment wish you to understand that I underrate its value for producing panoramas; for I intend taking one of the new lenses with me for that purpose, and hope shortly to be able to send you a favourable report of its working. Should it do all I anticipate, it will be a very valuable acquisition.

"You are desirous, no doubt, to hear something about the exposure required. By comparing it with the triplet, I find the time to be in favour of the new lens, using the smallest stop of each.

"Pray excuse this hastily-written note, and believe me, dear sir, yours truly, (Signed) "W. England.

"J. H. Dallmeyer, Esq."

After votes of thanks to the President, Vice-Presidents, Treasurer, Secretary, and Committee for the past year, and due acknowledgments,

Mr. Hart read a paper "On the Elimination of the Double Hyposulphite of Soda and Silver from Photographic Prints" (see p. 290). Mr. Hart gave an interesting demonstration of the working of the process he proposed. He also exhibited two halves of the print on which he had experimented upwards of two years ago. Neither half was changed in appearance; that which was submitted to the chlorine unwashed was, so far as we could judge by gaslight, bright and black, as at first; and that which had been a little washed was a little bleached at the time, but no other change had apparently taken place.

After a vote of thanks, a general conversation on the subject followed, in which the Chairman, Mr. Davis, Mr. Simpson, and Mr. Hart took part.

Mr. Howard asked if the method proposed would save washing the prints.

Mr. Hart said he did not intend to suggest any neglect in washing, but to use this as an additional safeguard.

Mr. Simpson said, if he apprehended the case rightly, in no case was it intended that less care should be taken in washing when these oxydizing agents were used. But as, with the utmost care, traces of hypo remained after washing, it was intended to get rid of them by converting them into sulphates.

The Chairman asked if any danger to the beauty or depth of the picture was involved in the operation.

Mr. Hart said there was not any perceptible bleaching action exercised by the proportion necessary to effect the operation.

The Chairman said, that as very slight traces of sulphur would endanger the permanency of the print, might not very slight traces of chlorine affect the beauty? Chlorine was a very powerful bleaching agent, and had a great tendency to destroy the fabrics with which it came into contact, as was often found where it was employed in manufactures.

Mr. Hart said it had been his intention to show the properties of chlorine in various forms; but had not opportunity at present. Where chlorine was destructive to fabrics, it was used in such a mode as produced its most violent action; for instance, in discharging the colour from portions forming the pattern of dyed goods.

The Chairman asked if the same risk would exist in using deutoxide of hydrogen.

Mr. Hart said, as precisely the same agent operated in both cases—oxygen—he did not think that it would make any difference.

After some further conversation,

Mr. Cooper remarked that he thought the suggestion for the use of a dilute ammonia bath was most important, both with the use of peroxide of hydrogen and hypochlorite of soda, as it furnished a means of getting rid of the chloride of silver, which otherwise would undoubtedly have sullied the print.

The Chairman said the hypochlorite of soda seemed a much better agent than chlorine water, for many reasons. It would also have the advantage of deutoxide of hydrogen in stability, as the latter had a tendency to decompose.

Mr. Hart, in answer to questions, said that hypochlorite of soda was a constant compound, and tolerably stable. It would not stand boiling.

Mr. Simpson remarked, that whilst the means of getting rid of all the hyposulphite from the print was doubtless most desirable, and was one important step in securing permanency, it was important to remember that the causes of fading were various, and the use of a fixing bath in which, from various causes, a slight sulphur toning action was set up was one of the most frequent. The oxidizing agencies would not prevent fading from such a cause. He also called attention to Mr. Spiller's recent experiments with carbonate of ammonia, and gave some details.

The question of open air meetings during the summer was then discussed, and it was finally resolved that due intimation should be given to the members of the determination of the committee in reference to this subject.

The Chairman invited the members to meet him at his house, 204, East Street, Walworth, at six p.m. on the last Saturday in July.

The proceedings then terminated.

Correspondence.

THE "REASON WHY."—ALKALINITY *VERSUS* ACIDITY, ETC.

Sir,—In my last paper, I had occasion to remark that a question which admits of argument necessarily possesses two sides, and the verdict must be in favour of that side which can offer the best practical proofs. A mere statement goes for nothing. In this practical age proofs are required, and the arguments offered by such proofs will be accepted at their full value, and the theories on which such labours are based will pass, in most instances, unquestioned; for where a practical end is desired, nothing is gained by quibbling over matters which are too subtle in their nature to reduce by argument to an entirely indisputable form. I would not state that no advantages follow such controversies, for, after all, there is a charm in mental efforts, more especially when such labours are expended in exploring hidden depths; but I contend that, so long as such labours are directed towards the attainment of a definite practical object, and the object aimed at is at length reached, it matters but little what theories are adopted, so long as they place into our hands the power to direct. Such power the adoption of acid toning, I find, has placed into my hands; and were it not that I might be accused of writing up "shop," I would here produce evidence, from the hands of known men, which would prove that the method I advocate is at least capable of yielding beautiful results. I have no interest in pushing the question; on the contrary, my best interest would be served by remaining silent; but as a lover of science, I never allow personal gains to interfere with my efforts to advance photographic science. So far as the toning capabilities of Mr. Seely's toning solution are concerned, even if a grain of gold were to tone one sheet or fifty, it matters little; my chief aim is to show that a solution which will not tone without an application of heat, and needs special papers and special conditions to coax it into a good working humour, must, perforce, be somewhere wrong in principle; and my experience emphatically points to alkalinity as the source of error.

There exists a gap between the toning and fixing bath which I have already shown can be bridged over by immersing the prints into an alkaline solution. But to apply the severest test:—Supposing the infinitesimal quantity of acid is not neutralized; what follows? Hyposulphurous acid is liberated: hyposulphite of silver is formed, which, in the presence of an excess of the hypo salt, resolves itself into a soluble double salt.

The anecdote introduced by Mr. Seely in his letter does not appear to me to touch the case in question, as the disastrous effects which resulted when he immersed his prints in a chloride of lime solution do not appear to bear any analogy to the subject in hand, as the bleaching of the prints did not receive an attack from the acid, but from the chlorine, which the acid had liberated; and the proof of the lime solution remaining neutral in the absence of an acid goes to support my case. Lime holds chlorine with a feeble grasp. An acid rushes to join the lime, and chlorine rushes to devour the prints. Such is the theory which washerwomen practice (if they *don't* understand the "reason why"), always remembering that a less costly food is offered when chlorine is let loose by the laundress' vinegar bottle.

Next, as to the question of sun-printing. Great stress is laid both by Mr. Seely and Mr. Cherrill on certain remarks offered by Sir John Herschel. I acknowledge myself one of Sir John's most earnest admirers, and I congratulate him on the fact of his having so small a field to experiment on, where printing is concerned. The heighths and depths of mighty space have been secured by his piercing eyes. They have never, happily for him, had to dance over 140 frames, or the world would have lost many grand truths; but to the observant mind, each object is a page of a world's book, which all who run might read; and I flatter myself that with an attention divided by 140, by adopting shade principles, I have contrived to find a fraction or two to devote to useful knowledge, while following my racing avocation.

Now concerning perfect negatives, what should they be like to entitle them to be described as perfection? Go, ask Mr. Robinson, and he will show you perfection itself. He will show you negatives which present, from the deepest shadows to the highest lights, gradations as perfect as can be found in the finest engraving. He will show you negatives which will bear a depth of printing without deterioration of the quality of the print, which, if applied with the majority of negatives, would produce a hideous roast. Now it has been my good fortune to obtain some of those negatives to experiment upon, and I printed both in sun and shade, and found, to my great satisfaction, that my ideas on shade principles had not been grounded on erroneous premises. The shade print in each case was infinitely superior to the sun one, a strong sensitizing solution being used for the experiment. For portraiture, at least, we take our negatives in diffused light; at all times we develop them in diffused light, and examine their progress during piling up in light of like quality. Then surely, diffused light having throughout been adopted, diffused light should be applied as a test for perfection.

And now I bid adieu to the subject of alkalinity *versus* acidity, leaving each of my readers to form their own opinions, for I believe that when a question has been ventilated as far as wordy argument will go, to cling longer by mere repetition is to tire the patience of the reader, and, in the end, must provoke uncourteous personalities.

I had intended offering a few remarks on the per-oxide of hydrogen, but having received and accepted a courteous invitation from Mr. Hart to witness a few experiments bearing on the subject, I have deemed it more becoming to allow the subject to stand over until Mr. Hart has read his paper.—Yours, &c., "The Photographer's Assistant."

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Photographic Notes and Queries.

Photographic Enlargements.

Sir,—In answer to "Remarks on Photographic Enlargements," from "An Artist," it is to be stated that, if, literally speaking, enlargements can be produced from any negative, it cannot be done in an effectual, useful way. If an enlarged photograph is required from a negative bad in every respect, dirty, out of focus, greatly under or over-exposed or intensified, because no other better can be procured, and there is necessity to have something, it must be expected that this something shall be an unformed, horrible affair, where no true, firm outlines, proper shades, or half tones are to be discovered by the artist, to guide him to work out a picture worth anything; at least, as far as a true representation of the original is considered; then it is not advisable to try to obtain enlargements from negatives of the above genus. But between negatives of such class and those endowed with all the qualities constituting a perfect negative, either for immediate printing or for enlargement, the scale is long. From a negative irreproachable, one-inch head, which has been taken for the purpose, an enlargement to eight-and-a-half inches can be produced, so correct in sharpness, gradation, softness, and proper amount of force, that a tasteful hand can finish the work with few touches; and from negatives ranging between perfection and worthlessness, enlargements may be obtained of various relative value; the worth of them when prices is not too much considered, and proper treatment resorted to, will be very presentable, useful, and acceptable by "An Artist."

When I am visited for an enlargement, I show a variety of enlargements from negatives of widely different qualities, pointing out the sort of result which my visitor can expect from his negative; after agreeing on such basis, I would have no objection, no more than any other firm, I think, would have, to the approbation condition of "An Artist."

In cases of necessity, the very worst negative can be made use of, in my opinion, by producing a new one from a copy of it, elaborately worked up.—I am, Sir, yours obediently,
G. Rousseau.

28, *Hanover Street, Peckham, June 18th*, 1866.

Enlargements from Ordinary Negatives.

Sir,—I am happy to relieve the mind of your correspondent signing himself "An Artist," by receiving an ordinary C.D.V. negative, and returning a solar enlargement on approbation.

Mine are all done from the regular negative, and if that is really good, with the shadows evenly disposed, there is no fear of the result.

I forward an enlargement from the same negative as the enclosed C.D.V., and shall be happy to undertake a few for the trade.—I remain, dear Sir, yours truly, C. R. Pottinger.

Promenade, Cheltenham, June 18, 1866.

[Mr. Pottinger, a photgrapher of many years' experience, sends us a specimen from an enlarged negative, and also a large developed print, with card pictures from the same negative. In each case the enlargement is little short in excellence of the direct small picture.—Ed.]

Photographic Enlargement.

Sir,—Allow me a few words in reply to "An Artist" on the above subject.

1st. It is not only *possible* to make *good* enlargements from *ordinary* printing negatives, but it *is done* daily in my establishment.

2nd. If "An Artist" will forward me a negative which will give a *good* print on paper. I will undertake to return him an enlargement little inferior in definition to the original.

Permit me also to add, in reply to your foot-note, that I hope to be able to forward you, in a few days, prints from some ordinary varnished printing negatives, which have reached me in the course of business, with enlargements from the same, for your inspection.—I am, dear Sir, yours faithfully,

J. W. Pickering.

18, *Moor Street*, *Birmingham*, 18*th June*, 1866.

Enlargements.

Sir,—"An Artist" in your last makes such strange blunders with regard to enlargements, that I beg to offer a few remarks in reply.

It is strictly true to say, "no special negative is required" for my process, and life-size portraits are daily produced from such plates, and printed on salted paper. Photographic enlargements (except under circumstances I will point out) are not intended for exhibition without painting, either in crayon or some other way. There are probably not twelve photographers in England who can take a portrait suitable for enlarging to 24 by 19, and show untouched.

Those done by Dr. Monckhoven combine the highest artistic and photographic talent, and have not been approached in this country. It is a very common idea amongst country photographers that their negatives will enlarge to life-size without touching up. I consider it an injury to the art to show them in this way.

A very few choice negatives will produce enlarged negatives to print fine untouched copies, but they must be very fine plates indeed.

Your correspondent seems to have been badly used by enlargers. They would not supply him on approbation! I wonder if a hotel keeper would supply him with a dinner on approbation! If it digested well, he should pay for it; if not, he would get a dinner for nothing.

It seems inconceivable that any one should not yet know that everything depends on the original negative. Enlarging is now well understood, and is probably one of the most definite operations of photography. To get a good enlargement, we must have a good original. I think the firm who replied to "An Artist" that they never worked on approbation were quite right. Suppose "An Artist" were no judge, and incompetent to decide, all their labour would be thrown away. If orders be given, they will necessarily be of the usual business-like nature, and the writer will be bound to pay for them.

Samuel Fry.

Photographic Enlargements.

Sir,—A correspondent in last issue of the News, and yourself, I think, justly condemn the enlarging from usual printing negatives. For the benefit of my photographic brethren, by way of caution, I beg to inform them that I, some time ago, took some negatives, specially for enlargement, which I forwarded to a person who advertises that his enlargements are unequalled. He said the negatives were all that could be desired for that purpose. However, before a specimen could be sent to me, the cash must be remitted. After which I received a specimen of soot and white-wash work, stained in all directions with a mixture of green, which was at once thrown amongst the waste paper. A Country Photographer.

Photographic Enlargements.

Sir,—My attention having been called to "An Artist's" letter on the above in the last week's News, and having had some years' experience with the solar camera, I must beg to tell "An Artist" and others, that without a *special negative* there never can be a good enlargement. It has been so repeatedly stated what sort of negative is best for that purpose in the News, that I need not here state it again.

One reason why enlarged photographs are not admired by the public is, that photographers, as a rule, do not understand the sort of negative to make that will produce them. When they do, they can have enlargements made equal to any life-size lithograph.

I can only again state that an especial negative is required. No amount of copying will produce one from an unsuitable negative or print. Those who profess to do enlargements from any negative only cause vexatious disappointment, as in "An Artist's" case, and many others.—I am, Sir, yours truly,

Sydney Smith.

Photographic Provident Society.

Sir,—I fear the Photographic Provident Society will be nothing advanced by the somewhat vague suggestion of "Rusticus" in your last. He asks if it would not be much more reasonable of the *working* photographers to commence at once to subscribe to a fund for themselves, instead of waiting for others to start it for them? and then expresses his willingness to join, if any established photographer would act as secretary, and anything such as the "Hearts of Oak," or like society, were contemplated; that is to say, I presume, that he, like hundreds more, will wait for *some one* to start the society for them. Now, Sir, it is no reflection upon the energy of operators to assert that, unless the matter be taken up for them by those whose influence, leisure, and position will allow them to organize, make known, and subscribe to such a society, its existence will remain among the fictions that ought to be realities. It will be the old story of "everybody's business—nobody's." Now we had, some time ago, the offer of service as secretary and collector, on the part of a gentleman well known amongst photographers (Mr. Dring), as also the tender of some very handsome donations (your own among others); so that it would appear nothing more is wanting than some agreement among photographers at large as to the acceptance of these vast helps towards the accomplishment of the desired object.

Now, Sir, I think that if, among those gentlemen so desirous of aiding the cause, there be one with the facility to offer the use of a room for a meeting, and you, through the medium of the News, were to convene and make known the time and place of meeting, the attendance at such, or the opinions expressed at it, might serve at once as an index to the propriety or otherwise of proceeding with a project which promises to yield such beneficial results.—I am, Sir, yours truly, Modus Operandi.

Walworth, *June* 19*th*, 1866.

[To give any chance of success, such an association must be initiated by men of position in the art, both amateur and professional. We fear that a few months must now elapse before either class can attend to the matter. Amateurs are out of town, and professional photographers too closely engaged during summer. We shall try to bring the matter to a practical issue next winter.—Ed.]

Talk in the Studio.

Professor Faraday.—The Council of the Society of Arts this year awarded their Albert gold medal to Professor Faraday, for his discoveries in electricity, magnetism, and chemistry, which, in their applications to the industries of the world, have so largely promoted arts, manufactures, and commerce. On Saturday, Mr. Hawes, Vice-President of the Society and Chairman of the Council, accompanied by Sir Thomas Phillips, Vice-President of the Society, and Mr. P. Le Neve Foster, Secretary, waited upon Professor Faraday, at his residence, and conveyed to him the medal. Professor Faraday's health would not admit of his attending a public meeting.

Photography and Slander.—A somewhat singular action was recently brought in the Queen's Bench, and heard before

Mr. Justice Lush and a special jury. Mr. Ernest Edwards, photographer, brought an action against the Earl of Cardigan for a slander which arose out of the Earl's comments on certain photographs executed for him. The defendant pleaded first not guilty, and secondly a justification. Mr. Coleridge, Q.C., and Mr. Sydney Hastings were counsel for the plaintiff; Mr. Bovill, Q.C., and Mr. Garth were counsel for the defendant. Mr. Coleridge said that this was an action for slander arising out of whether certain photographs supplied by the plaintiff to the noble defendant were or were not very fine works of art, and were worth the money that had been charged for them; and as that was a main element in the case, it had been thought better to refer the matter to Mr. T. R. Williams, the eminent photographer of Regent Street, rather than trouble the jury with it. Consequently a verdict would be taken for the plaintiff, subject to a reference. Mr. Bovill said they were all agreed that that was the most satisfactory mode of dealing with the case, and it would save the jury the trouble of having to decide between the contradictory evidence that would have been produced as to the photographs in question being works of art.

Citric Acid in Collodio-Chloride of Silver.—Mr. W. T. Bovey reminds us, in reference to a remark in a recent article, that he first proposed the use of citric acid in collodio-chloride of silver to supply an organic agent. He adds:—"The remarks on the fading of collodio-chloride prints are all nonsense, as I am in a position to prove. I have in my possession an opal print which I have subjected to the severest test. Without frame or protection of any kind it has been exposed for several months to warmth, cold, and damp, and up to the present moment it exhibits no trace of change. It was fixed with an ordinary hypo solution, and received no further washing than is usually applied to a negative. The image is as vigorous as an engraving, and the picture has been admired by all who have seen it."

Clean Fingers.—We are favoured by Mr. M. Whiting, jun., with the following recipe for cleaning the hands when stained with nitrate of silver, or other chemicals, without any danger:—"Put ¼ lb. glauber salts, ¼ lb. chloride of lime (the sanitary disinfectant), and 4 oz. of water into a small wide-mouthed bottle, and when required for use pour some of the thick sediment into a saucer, and rub it well over the hands with pumice-stone or a nail brush, and it will clean the fingers quite equal to cyanide, but without any danger. This will do to use over again until exhausted, and should be kept corked up."

Tracing Paper.—Open a quire of double crown tissue paper and brush the first sheet with a mixture of mastic varnish and oil of turpentine, equal parts; proceed with each sheet similarly, and dry them on lines by hanging them up singly. As the process goes on, the under sheets absorb a portion of the varnish, and require less than if single sheets were brushed separately. The inventor of this varnish for tracing paper received a medal and premium from the Royal Society. It leaves the paper quite light and transparent, it may readily be written on, and drawings traced with a pen are permanently visible. Used by learners to draw out lines, The paper is placed on the drawing, which is clearly seen, and an outline is made, taking care to hold the tracing paper steady. In this way elaborate drawings are easily copied.

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To Correspondents.

Collodion.—The use of old collodion for cleaning plates requires to be conducted with care, as the evaporation of the ether and the free iodine generally present are apt to cause considerable irritation to the eyes. To what surface do you wish to transfer collodion positives? If to black patent leather, moisten the film of the collodion and of the leather with alcohol to an ounce of which half a dozen drops of nitric acid have been added, then press the two surfaces together, avoiding air bubbles. Place them under pressure until the film is dry. When the leather is lifted up, the film will adhere to it, and leave the glass. The chief effect of leaving out the stopper of a bottle of ether is the loss by evaporation; but contact with light and air often produce a decomposition, causing the formation of acetic ether, which will be injurious in collodion.

J. Arkwright.—Good soft water may, it is probable, be used in place of distilled water in Mr. Gordon's process. The chief danger is in using water containing chlorides, carbonates, &c., which, coming into contact with the nitrate of silver solution, form irregular patches of insoluble salts of silver on the film, which eventually cause stains. Water sufficiently pure to make a nitrate bath will, however, probably answer this purpose. The causes of pinholes are many and various, and it is difficult to ascertain which is in operation, without an exhaustive series of experiments. The most probable cause, if you are certain it is not iodide of silver, is sulphate of silver, to be got rid of by adding nitrate of baryta. On boiling down a bath containing ether and alcohol, you do not entirely get rid of these substances, unless you boil to absolute dryness, but you risk changes by which complex organic silver salts are formed. If you boil down at all, carry out the operation until all the water is evaporated, and then fuse the mass, by which you will get rid of much accumulated impurity

D. Welch asks our opinion on a cabinet view, measuring over 8 inches on the base-line, taken with the new wide angle single lens of 5½ inches focus, largest stop. It is a most charming picture, well defined throughout, and exceedingly delicate and brilliant. The card enclosed is very good, although a little wanting in modelling in the face. The instructions were handed to our publisher, and shall receive attention.

C. H. F.—The registration of the tent to which you refer is no protection to it whatever. Such a thing cannot be protected by registration. The casket portrait is patented, not registered. Besides, as we have before pointed out to you, methods of photographing on uneven surfaces have already been patented, and methods of photographing on concave surfaces have already been published. Your method, if simple, might be useful, but, so far as we can see, could not be protected. We shall be glad to hear of the initiation of a photographic society in your town.

Pembuay.—All mercury intensifiers have a slight tendency to rot the film. You will find our comments on the process in question, and the advantages claimed for it, in an article on the subject published two or three months ago. The use of a pure neutral bath gives the greatest sensitiveness, and a strong solution of protosulphate of iron is the best developer where great rapidity is desired. 3. Within certain limits, the addition of bromide to the collodion promotes sensitiveness. 4. The intensifier we recently published, formed of persulphate of uranium and ferridcyanide of potassium, changes the deposit to a non-actinic colour, without sensibly increasing the deposit. Schlippe's salt, proposed by Mr. Carey Lea, does the same. Sulphide of potassium blackens the film by converting the silver into a sulphide. A dilute solution of bichloride of mercury, followed by a dilute solution of iodide of potassium, will give a greenish tint, which is very non-actinic.

L.—Measure from the point where the stop is placed. 2. Benzole or mineral naphtha will dissolve coal tar.

J. Schofield.—There is an improvement in your toning; the tone of No. 3 is very good. It is probable that your bath had been acid. With the light you describe, very perfect results cannot be expected; but, considering the circumstances, the pictures are not bad for a beginner.

G. Sanger.—Thanks. We will place the offer in the right quarter when the proper time comes.

G. Wallis (Whitby).—The cards received are very excellent indeed, far surpassing the average class of portraiture. The manipulation is faultless, and there is great delicacy and fine modelling, as well as brilliancy and vigour. The definition is also excellent in all cases.

Tintea and Toucher-up.—When you have reduced your waste silver to a metallic state, you can always sell it to any refiner at its full price. 2. If you can afford the head-rest in question, it will be a great acquisition to you. Your simplest plan will be to get it of the London agent.

Marsh Photographer.—There are various modes of throwing down the silver from old hypo solutions, but none so simple as that furnished by the use of sulphide of ammonium, potassium, or sodium. If you cannot get the sulphide, try the copper reduction. Place two or three plates of clean copper in the solution, and leave them there for a few days, when the silver will be found reduced in a metallic powder. Mr. Hart's silver-saver is very useful for this purpose.

Stereoscopic.—The best plan to mount cards is to damp first a number of cards, and then a number of prints; and then proceed to mount as quickly as possible. They should be nearly dry before rolling. 2. A saturated solution of gallic acid, which contains about four grains per ounce, is used; about half an ounce of solution will be sufficient for the plate you name. 3. We are unable to state which of the albumenized papers you mention is best. 4. The addition of alcohol to albumen solution generally precipitates albumen, but a single drop in an ounce will not, probably, affect the matter much.

F. F. M.—The addition of an oxydizing agent to an old hyposulphite bath would, by converting it into a sulphate, destroy its power to hold salts of silver in solution. Thus, if chlorine water or hypochlorite of lime or soda were used, the silver would be precipitated as a chloride. But this method would be too costly for recovering the silver from the hyposulphite solution. 2. Peroxide of hydrogen readily decomposes.

R.—All the examples enclosed are under-printed. With deeper printing, you will be able to get better tones, and also better modelling. 2. Avoid the use of painted backgrounds containing tessellated pavement or anything which distinctly marks the linear perspective in the background, and thus shows the discrepancy between the perspective of the objects photographed and the painted background behind them.

Several Correspondents in our next.

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Photographs Registered.

Mr. H. Parker, Greenhayes, Manchester,
Photograph of Oil Painting of Shakespere.

Mr. John Stewart, Glasgow,
Three Photographs of Rev. John Eadie, D.D.

F. R. Elwell, M.A., Weston-super-Mare,
Photograph of the Dean of Wells.

Mr. G. Hooper, Clarkington and Co.'s, Regent Street,
Photograph of Gen. Von Benedek.
Photograph of Gen. Gablenz.

*** All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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A VISIT TO MESSRS. MAWSON AND SWAN'S CARBON PRINTING ESTABLISHMENT.

A few days spent in the carbon printing establishment of Messrs. Mawson and Swan at Newcastle-on-Tyne have amply convinced us of what we were, from previous examination and experiment, disposed to believe, namely, the thoroughly practical and commercial character of Mr. Swan's carbon printing process. We have also learnt that all the manipulations can be carried out, under intelligent superintendence, by women and boys; and that there is not, and need not be, a larger per centage of failures from any cause, than inevitably arises in ordinary silver printing. Throughout the operations there is little left to chance; everything proceeds in an orderly methodical way, leaving little room for failure when certain primary conditions are complied with. It appears to have been Mr. Swan's aim to attain as much completeness as possible in all his arrangements before inviting the public to adopt a new method of printing in which their former experience with silver printing would avail them but very little.

The preparation of the "tissue" is a question which will give the public but little concern, as it will be supplied to them ready for use. This will doubtless be felt a great boon, not simply as saving a troublesome operation, but also securing a degree of excellence and uniformity which would be almost impossible in preparing the paper in small quantities. Messrs. Mawson and Swan prepare this tissue by machinery. A piece of paper twelve feet long is made into an endless band revolving round rollers, which keep it stretched, and repeatedly pass it over a surface of melted gelatine, sugar, and pigment, until a perfectly even coating of the right thickness is applied to the whole length.

The trough of gelatine is kept at proper temperature by means of steam. By repeated contact with the gelatine, a thin coating being applied each time it passes over it, a much more perfect surface and even thickness of the gelatine is secured than could be obtained by any plan which applied the full thickness at once; and by the constant revolution, until the gelatine is thoroughly set, waves of irregular draining are entirely avoided. It will be obvious that a perfectly even layer of gelatine could scarcely be applied to large surfaces satisfactorily without the suitable machinery which is here provided.

These lengths of gelatine are then cut up to specific sizes, and will keep *ad infinitum*, ready for sensitizing when required. We understand that a very complete assortment of tints and intensities will be supplied to the public. The various tints we have seen range from an intense, pure black, through the purple tints familiar on silver printing, to a rich sepia tint. These possessed varied intensities, suited to different classes of negatives, some being suited to secure a soft print from the hardest and densest negatives, and others to secure vigour from the weakest of negatives, so that it will be possible, by a simple classification of negatives, numbered in relation to the number of the tissue, to obtain, by a few repeated trials, the best result of which it is capable from almost any negative.

The actinometer devised by Mr. Swan, and recently described in our columns, is found in practice to answer perfectly, and is sufficiently simple to be prepared and worked by a boy, with such ease, as well as complete accuracy, that Mr. Swan remarked they would prefer to use it for silver printing instead of the old method of repeated examinations of the print itself. Possibly nothing can better suggest the certainty of the operations, than the mention of one illustration which came under our own notice. Whilst we were at Newcastle, the first print was taken from one of the largest negatives we have ever seen. This was the copy of a painting containing some hundreds of portraits, and, as will be readily seen, required a degree of minute perfection in every part, much greater than would suffice in a picture, a large portion of which was background or accessories, a minute defect in which would not readily be noticed. The dimensions of the negative were 32 inches by 16 inches. The first copy ever tried of this picture was printed whilst we were present, being commenced one afternoon, and finished—exposure, development, washing, drying, gelatinizing, transferring, waterproofing, &c.—the next afternoon in time for post. The print which was one of many others in course of production, was thoroughly good in every way, and pronounced perfect by Mr. Annan, who, in his satisfaction, telegraphed at once to that effect. We mention this case, because the first production of a picture so large, of a trying subject, might easily in any process have required two or three trial prints, before the best result was obtained; whilst here a print as perfect as could be desired was produced at once in the ordinary routine of operations.

The transferring, which might readily be supposed to be a delicate and a difficult operation, we found in practice to be exceedingly simple and easy, whether the transfer was made to paper or the mounting board. The former seems to have the preference at present with Mr. Swan, as it affords an opportunity for effecting the water-proofing to which we have already adverted. A word or two on this subject may be desirable. When the print is transferred from its temporary basis to a mounting-board, the adhesive material by which it is made to adhere to the board is gelatine; and should the picture at any future time be soaked in water, the carbon image might, by hard rubbing, be abraded or removed by the softening of the gelatine by which the adhesion is secured. When the print is transferred to paper an additional safeguard becomes possible. After the operation of transferring to paper is completed, the picture is plunged into a saturated solution of alum, which renders the gelatine used for mounting insoluble, and secures the highest posible certainty, not simply of permanency, but of immunity from injury by damp, the one cause by which gelatine might be supposed to suffer deterioration.

In connection with the transfer process there is a very elegant operation to mention. In some instances Mr. Swan has thought it desirable to add a little of a white pigment to the gelatine with which the transfer is effected, in order to give brilliancy to the whites of the picture, and it is in connection with the mode of doing this that we have to notice an extremely neat method of working. All who have used the eburneum or similar processes are aware of the risk, in introducing a white pigment into gelatine, of getting a coarse granular effect. Mr. Swan avoids all chance of this. Instead of introducing an insoluble white pigment into the gelatine, he introduces a soluble material which can readily be converted into the required pigment. Chloride of barium is dissolved in the gelatine solution without difficulty, leaving it as clear as at first; and with this mixture the transfer is effected. When the print is subsequently immersed in the solution of sulphate of alumina (alum), a decomposition ensues, and the chloride of barium is converted into sulphate of baryta, a pigment of very pure white, which produces the desired end without difficulty.

The establishment which Messrs. Mawson and Swan have devoted to carbon printing is admirably fitted for the purpose, and will admit of a much more extensive staff of work-people than they have found it desirable in the experimental stages of the process to employ. The operation of printing some large orders is now steadily progressing, and we have reason to hope that before long all arrangements will be complete for enabling the public to test the advantages of the process. We have not entered into minute details of working here, because a manual of instruction is in course of preparation, which will afford the fullest and minutest information in regard to every part of the process.

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RESIN DRY PROCESS.

Every practical hint coming from a photographer of such known skill and wide-spread reputation as Mr. England, will be listened to with eager attention, and in the search after the best dry process his experience will be regarded as possessing much weight. All his triumphs hitherto—at the Falls of Niagara and other American scenes; in the streets of Paris; in the International Exhibition of 1862; in the Swiss mountains—have been secured with the wet process. It will readily be conceived, however, that the photographer who devotes so much of his attention to the wild scenes of nature, does not drag the dark tent and other adjuncts of the wet process up mountains for the pleasure of the operation. It is simply because he cannot secure anything like the same delicacy and certainty, or any approach to the same rapidity, by means of any dry process, that he is content to be burdened with the impedimenta of the wet. Mr. England has, however, anxiously sought a dry process, and has for years experimented with a view to find one on which he could rely.

Some four years ago he devoted considerable attention to tannin and honey, and for a time with a fair promise of success; but, after more mature experience, he found sufficient uncertainty and other drawbacks to induce him to abandon the process. He has more recently devoted considerable time and experiment to the use of resin in the collodion, some account of which will be found on another page. In result, Mr. England has attained the highest success which can perhaps be hoped from a dry plate. It is probable that whether the action of light on the sensitive film be physical or chemical, it will always most readily act on the wet plate, as it is well known that in most decompositions moisture, if not absolutely necessary, materially accelerates the reaction. Mr. England finds that about twice the exposure necessary for wet plates is sufficient here. It should be distinctly understood, in this estimate, that Mr. England obtains just the same amount of softness, delicacy, and detail in the dry plate which he regards as imperative in the wet. We mention this because we have often noticed that many persons appear to have two kinds of standards of excellence, one for dry plates, and another for wet, an amount of under-exposure and hardness being tolerated for the former which would be regarded as inexcusable in the latter; and it is no uncommon thing to see in prints from what are termed rapid dry-plate negatives, patches of black without an indication of detail, which are regarded less as defects resulting from under-exposure, than as evils inherent in dry-plate work.

The negatives we have seen produced by Mr. England, by means of the process described, have differed in no respect from good wet collodion negatives. We have a portrait before us, from a negative taken in the glass room in nine seconds, with a quarter-plate lens, in no respect differing from an ordinary wet plate picture. Much of this rapidity Mr. England attributes to the facility which the process offers for the use of the ordinary iron developer in place of pyrogallic acid. It will also be seen that he adds a large proportion of bromide to the collodion.

There is a drawback, however, to the process: the resin in the collodion reacts upon the bath, and eventually produces fogging. To many, especially those who object to "doctoring" baths, this will be a serious objection. In such case, it would be desirable to work in flat baths, requiring the smallest possible quantity of solution for the sensitizing of each plate, so as to avoid the injury of a large quantity of solution. Mr. England, however, finds no difficulty in restoring the bath, which, after a dose of cyanide and sunning, he finds to work more perfectly, even for the wet process, than a new bath, giving a rich, creamy negative rarely obtained.

Mr. England believes the resin to play merely a mechanical part in opening the film and rendering it easily penetrable. We think, however, there is reason to believe that a trace of an organic salt of silver is formed in the film, which, in accordance with Dr. Vogel's theory, absorbs the iodine liberated from the silver by the action of light.

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A NOVELTY IN PORTRAITURE.

Messrs. Southwell Brothers have just patented a novelty in portraiture which promises to afford facilities for the production of some very pleasing results. It consists in a simple and easily-applied combination of photography and lithography.

Most of our readers are familiar with the practice in lithography, especially effective when that art is applied to portraiture, of printing on a tint previously applied by the stone (the portions intended for the highest lights being taken out, so as to leave the paper white in such places). The tint thus applied is then printed over, and it forms the half-lights throughout the picture, the portions stopped out, consisting of pure white, forming the chief lights, and giving much more brilliancy to the whole picture than could have been obtained if the subordinate lights were as vivid as the principal lights. An attempt at a somewhat similar effect has often been made in photography by a second printing in vignetting, the vignetted figure being graduated into a grey ground. Another aim at a similar effect has been made by some skilful artists by another method. They have cut out the head from a photograph, and attached it firmly to a board of greenish-grey, and rolled it until the junction was imperceptible. The colourist has then worked on the whole with water-colours, the pure white upon which the head is painted giving it great brilliancy, whilst the grey upon which the drapery and background are painted subordinate these to the head, and give a very pleasing effect to the whole.

Messrs. Southwell Brothers aim to get these effects much more efficiently, with a ready facility and on a scale which are calculated to popularize the new style, which will probably give one of those new impetuses to the art which it seems to require. They complete the photograph, which by preference is a vignette, and then print upon the background, and such parts of the figure as may require it, a flat tint; it may be of a delicate grey, or of a greenish grey, or a lavender, or an India tint, always choosing a colour which will retire. This tint is blended with the vignette and with such portion of the drapery as may be desired, lights in the latter having been taken out on the stone. The result is exceedingly effective and pleasing. In an example before us—a card vignette head of a young lady—the tint covers the background and runs into the drapery, leaving the face, hair, and white lace untouched. The colour is a very delicate greenish grey, with nothing positive in its hue; the print is somewhat warm in tone, and at first glance has the effect of a tinted picture, from the rosy hue given to the face by the slight green tint in the background. On larger pictures it is still more effective, giving great brilliancy, vigour, and relief to the figure, and a pleasing effect of high finish without anything meretricious to the whole. As the lithographic tint is easily worked over with water-colours, it will readily be seen that this method lends itself to the purposes of the colourist, giving facilities for much effect with little expenditure of labour.

We understand from Mr. Southwell that the working of this method is very easy, and readily acquired, even by the uninitiated. In working with cards, perhaps a dozen will be worked on one stone. The portion of the head and figure intended to be kept white is cut carefully out of a print, and by its aid the stone is stopped out accurately. When a dozen heads are thus completed, the whole stone is rolled up so that it prints a uniform tint of whatever colour may be desired, everywhere except in those places stopped out on the stone. By a simple method, exact register is obtained, so that in printing there is no difficulty. The tint thus applied soon dries, and although a trifle less glazed than the surface of albumenized paper, it harmonizes well with it. The cost will, we understand, be light, probably somewhere from half-a-crown to five shillings extra for a dozen cards, whilst the extra price obtained from the public will probably be more than double. We understand that Messrs. Southwell Brothers intend to issue licences; and they will, we believe, undertake the work of preparing and applying the tints for those who do not care to obtain the appliances of lithography.

ENLARGEMENTS: ARTISTIC AND COMMERCIAL ASPECTS.

A question of considerable interest to professional photographers has recently been the subject of some correspondence in our columns, upon which a few remarks may be useful. The practice of photographic enlargement is a branch of the art which, requiring special appliances and special experience, naturally falls into the hands of those who devote themselves specially to such work, by whom better results, at a less cost, can be produced than would be possible to the mass of photographers with imperfect appliances and little or no practice in this direction. In order, however, to the satisfactory transaction of the business involved, it is most important that a clear understanding should exist between the parties as to what is required from each, both in an artistic and a commercial sense. There are three questions to be considered: What amount of excellence may be legitimately hoped for in enlargements?—What kind of negatives are required?—and What commercial understanding should subsist between the parties concerned?

What amount of excellence may be legitimately hoped for in enlargements? Of course it will be answered that this much depends on the character of the negative. Assume, however, that the negative is as perfect as the average of negatives, may enlargements as satisfactory as the average of prints be obtained from them? We answer unhesitatingly, no, especially if the enlargement be to life-size or anything near it. The minute defects, either in the photography or in the sitter, which were scarcely noticed in the small picture, become exceedingly offensive when magnified in the enlarged print. In fact, however perfect the photography, it is very improbable that ten per cent. of the sitters who present themselves to the photographer would bear the ordeal of photographic portraiture in life-size without any retouching. We have seen many hundreds of enlargements of all kinds, but we have not seen more than a score of life-size photographs which, to our taste, were presentable, untouched. Of these, a few were done on the Continent, a couple by Mr. Stuart of Glasgow, and the bulk by Mr. Mayall, and in all cases they have been printed out, without development, by the solar camera. But we may go further than this: of the few perfect life-size untouched photographs we have seen, there is scarcely one which, except as an example of technical excellence, or from some interest in the original, we should care to possess. The pictorial qualities would never attract us. Monochrome in its most perfect form is not well suited to life-size, and when presented with the literal and uncompromising truth of photography, there is something painful in it. In a small picture, the representation of the human face, in light and shade only, may be very pleasing, and suggests no incongruity; it is manifestly a conventional representation, a picture of the person represented. But when that representation is of life-size, and produced with the vivid reality of a good photograph, the want of colour becomes painfully felt. It is a ghastly semblance of life, the more like the more ghastly. "It seems so near, and yet so far," from possessing a living soul. This is true, if it be well done; if it be ill done, it is simply a hideous travestie. A very little handiwork by an artist improves matters considerably, even in monochrome, the more so if he very distinctly give it a conventionally artistic character, and so remove it from the close resemblance to life itself, but life without the sacredness of colour.

We believe, as a rule, that a life-size portrait ought to possess colour. It may be just the suggestion of colour, by a touch in the cheeks and lips, like the chalk portraits of Sir Thomas Lawrence, Richmond, and others. Enlargements to half the size of life may be made very effective by retouching in monochrome; and in some cases, with fine subjects, perfect negatives, and skilful enlarging, they are very pleasing without any retouching. Nevertheless, we feel that, in the majority of instances, enlarged portraiture requires some treatment by the artist, as much for the sake of the sitter as that of the photograph.

What kind of negatives are required? For a good enlargement, the most perfect negatives possible are absolutely necessary, as every shortcoming will be exaggerated. For the best result, undoubtedly a special negative is required, as the best negative for ordinary printing is not the best negative for enlargement. To secure a perfect enlargement, a negative should be taken for the purpose. The figure should be carefully lighted, so as to get well-marked contours without deep shadows, and fine modelling without at the same time minutely rendering rugose texture, wrinkles, &c. The definition must be as perfect as possible, and spread as much as possible over every plane. The collodion should be fine and structureless, as every wave, line, spot, reticulation, or morocco-like texture in the film will, when magnified, become a serious eye-sore. It must not be the slightest under-exposed; full exposure, besides securing detail and softness, will tend materially to remove the harshness of freckles, wrinkles, &c., which seem exaggerated so fearfully in the enlagement. Without being merely a phantom image, the negative should not be intense, but one which would be slightly too weak for ordinary printing. It should be perfectly clean and free from fog or deposit in the shadows, as a foggy deposit in the negative is represented by a coarse granular effect in the enlargement. The negative must also be left unvarnished.

All these conditions are necessary to produce the best possible enlargements. But the question arises, Is it possible in one case in twenty to secure them? We fear not. It is not every photographer who, without experience, could produce all the conditions at will, even if he tried. But apart from this, to deal with the matter commercially, enlargements are rarely ordered under circumstances which permit the negative to be taken on purpose. In very many instances the idea of the enlargement is an after-thought, and it has to be executed from some existing negative, and to demand another sitting would often risk the answer, "Oh, well, never mind at present; I will sit some other time," a contingency the photographer would rather avoid. Probably by far the greater number of enlargements ordered are of portraits of the dead or absent. Possibly a small negative exists, possibly only a Daguerreotype, a glass positive, or a card, and the negative must be copied from one of these. Under the best of circumstances, the enlargement has often to be produced from a negative which has been varnished and printed from, acquiring minute spots or abrasions, which seriously mar the beauty of the enlargement. Under all these circumstances, it is clear that no enlargement could be obtained if the special negative were imperative.

It should be understood, then, that for a thoroughly good enlargement, one with any approach to perfection in an untouched state, a special negative is required, and this more imperatively for the solar camera than for the process in which an enlarged negative is first obtained. In the latter process there is more latitude in the quality of the negative than in the former. As a rule, a thin negative is very necessary to softness and detail in a solar camera print. Where an enlarged negative is obtained, it is more easy to modify the result. If the original negative be clean, well defined, and well lighted, it is possible to get softness, even if the original negative be too intense, or to get vigour when the original is weak; but if the original be stained, or dirty, the enlargement cannot be clean. If the original be wanting in sharpness, the enlargement cannot be well defined. If the original have black shadows without detail, the enlargement will exhibit these faults in at least their full degree. It becomes the more manifest, then, that, as a rule, the enlargement may serve as a basis for the work of the skilful painter, but is of little service in untouched portraiture.

What understanding should subsist between photographers and those who undertake professional enlargements? This is a question upon which it should be scarcely necessary for us to make any comment; but the letters in our last, and the facts which constantly come under our notice, seem to suggest the importance of a few remarks. It should be perfectly understood that good enlargements cannot be expected from bad negatives. This fact would seem self-evident; but the imperfect negatives we have seen sent to many enlarging establishments, with the full hope that good amplified prints would be returned, show that this is not well understood. A recent correspondent made a somewhat comical suggestion, to the effect that those who undertake enlargements professionally should copy the negative sent, so as to get the right qualities, as though by any amount of copying a bad negative could be made a good one. We have already said that, in many instances, the professional photographer has no control over the character of the negative he has to copy; but he should be prepared for receiving the imperfections of the original, and often in an exaggerated degree, in the enlarged print from such a negative.

Photographers should not expect those engaged in enlargement to work on approbation. The fact that many of the negatives from which enlargements are required are bad, would be in itself a reason against this practice, and in proportion to the badness of the negative will be the amount of time, patience, and material expended in getting any presentable result, and in inverse ratio the probability of the result meeting with approbation. As a rule, the photographer requiring the enlargement is less capable of judging—from having less experience—what is a fair result from a given negative, than the enlarger is, always supposing the latter to be an honest and a capable man; and working on approbation is frequently referring the decision to the person least qualified to decide. On the other hand, of course, it is urged, and with some force, that it is unfair for the photographer to be expected to pay for a result which he considers bad, or his customer will not accept. This is perfectly true, but in refusing to pay for the enlargement he is undertaking to decide that all the fault is in the enlarger, when it is just as probably in the negative.

We have heard the argument used, that a man does not pay for a coat or a pair of boots which do not fit him. But the cases are not parallel. The coat and boots are articles which, if they do not fit one man, may fit another, and there is not an absolute loss to the producer if they are returned. A photographic enlargement of an ordinary portrait, even if tolerably good, is one of the most valueless things we can conceive to any one but the owner; if from a bad negative, is simply worthless. It is waste paper, and nothing more. The return of it on the hands of the producer is to him so much time, silver, paper, &c., &c., thrown away; and for the enlarger to undertake such work, from any kind of negative, on the mere chance of being paid for material and labour, would be folly indeed. It would be entering into a speculation with a chance of losing all, and winning nothing. The practice of working on approval would moreover involve the temptation, in unscrupulous persons, to send out two or three negatives to different enlargers, with the intention of keeping and paying for the work of one, and rejecting others, a practice manifestly unfair in its operation. That some enlargers are willing to undertake the risk does not alter the facts. That they should be willing to do so argues great confidence in the results they can produce, and a greater confidence in the negatives they will receive for the purpose than will, we fear, be justified by experience.

There are other questions relating to this subject upon which we have been requested to give an opinion, upon which we cannot enter, such as the question when should enlargements be paid for, on or before delivery, &c., &c. These belong to the general subject of trade, and have nothing which especially connects them with photography. It is the general question of cash or credit, and rests entirely on the amount of trade confidence existing. We have dealt with the other questions because they are more purely photographic, and because many appeals for our views on the subject had been made. To us, the questions we have discussed appear tolerably plain: exceptions to the general fairness of the case we point out, arising from bad judgment in employing incompetent men, will doubtless often occur. But in all business transactions this is a kind of mistake which has to be paid for.

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LARGE CARBON REPRODUCTIONS.

We have referred, in a previous article, to the successful application of carbon printing to some very large reproductions. It may be interesting to our readers to learn a few particulars of these reproductions, as illustrating the mode in which photography is taking the place of engraving for many valuable purposes in the rapid duplication of works of fine art. The progressive people of Glasgow have before signified their appreciation of photography for the purpose of art reproduction in the successive issues of photographs in connection with their Art Union. In the present instance, photography is applied on a more extensive scale for this purpose than on any previous occasion that we remember; and the picture will become historical in connection with photography as the first large issue, consisting of photographs of the largest size, ever produced by carbon printing.

The subject is one full of interest to every one who can admire heroic self-abnegation in the assertion of principle, and to Scotchmen will possess an especial value as an illustration of national character, whatever their especial views on the question at issue. It is a picture commemorative of the Disruption in the Church of Scotland in 1843. The subject is the "Signing of the Deed of Demission," painted by Mr. D. O. Hill, Secretary to the Royal Scottish Academy, a gentleman whose name has been many years associated with a deep interest in the art capacity of photography, and with some of the most artistic calotype portraits ever produced. The picture contains nearly five hundred portraits of ministers of the Scotch Church, who gave up livings, manses, glebes—in short, all the temporalities which their connection with the Church gave them—in the assertion of liberty of conscience. Photographs of the picture will be issued in three sizes, ranging from 24 inches by 9 inches to 48 inches by 21¼ inches, at prices ranging from a guinea and a half to twelve guineas; and we believe a very handsome subscription list has already been obtained. The following extracts contain some details, which will be read with interest:—

> In 1843, when this work was projected, a prospectus of a high-priced engraving from it, in mixed mezzotint, in which the painter was pledged that his canvas would contain upwards of two hundred portraits, was issued, and subscribed largely for. The long delay, however, in the production of the picture, arising, in great measure, from its now greatly expanded plan, and the more than doubled number of portraits introduced, rendered the subscription list in a large measure unavailable; and as the execution of such an engraving, of any high degree of excellence, would involve another long and uncertain term of years, the whole scheme of an engraving has been abandoned.
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> The recent extraodinary advance of the science and practice of photography has suggested to the artist a more rapid and a more exquisite mode of reproduction than, in the circumstances, he could have hoped for from any engraver, however skilful; and after much careful consideration, and with high professional approval, he has entered into an arrangement with that admirable photographer, Mr. Thomas Annan, of Glasgow and Hamilton, for the rendering of his picture in several sizes of photographs, varying from 20 to 48 inches in breadth. He will thus be enabled to supply copies of different sizes and prices, but all, as the specimens will show, of a style of photographic manipulation equally admirable, novel, and extraordinary.
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> His negotiations with Mr. Annan were scarcely completed, when he was made aware by that gentleman of the perfecting of a process of printing in carbon, patented by Mr. Swan of Newcastle, which not only produces prints of a delicacy and power markedly superior to the best specimens of the old method of printing, but, by substituting carbon for the residuum of silver, secures the impressions from the chances of evanescence, and renders them as permanent, according to the highest chemical authority, as they are remarkable for delicacy, beauty, and power.
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> Mr. Annan having for this work commissioned, from the eminent optician, Mr. Dallmeyer, a large photographic camera of the latest and most perfect construction, has already produced from the picture a considerable number of negatives of consummate excellence, of which brilliant proofs in the old silver printing have been obtained of various sizes, and these are now exhibited along with the picture. But along-side of them is now shown "the first impression in permanent carbon printing," by Mr. Swan, produced by his patented process, which already, in his hands, seems to have reached the very acme of perfection.
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> It is worthy of notice, in passing, that the portraits made chiefly for this picture in 1843 by Mr. Hill and his late friend, Mr. Robert Adamson of St. Andrews, by the then newly-discovered photographic process of Mr. Fox Talbot, called the Calotype or Talbottype, but until then almost unknown or unapplied as a vehicle of artistic thought and expression, were mainly the means of first raising the process to the rank of a fine art, or rather to that of one of its most magical and potent auxiliaries. And it is a striking coincidence, that while the commencement of the picture was thus marked by the elevation and higher application of photography, its completion, by a combination of improved processes, seems destined to aid in the inauguration of a new era in the reproduction of works of art. And it may also be remarked that, long retarded as the completion of the picture has been, its translation and multiplication by photographs, so beautiful, and at the same time *imperishable*, even a few weeks or months earlier than the present time, could not, by any then existing means known to the artist, have been secured.
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> It may be here stated that economy had no place in the arrangements for abandoning the scheme of the engraving and adopting that of the photograph as a means of reproduction; for besides the saving of years of anxious waiting, above referred to, the engraving of a large plate would, in the event of a wide circulation, have been a much less expensive undertaking than the printing of a great number of large photographs. It should also be stated that no impression will be issued that does not pass the approval of two gentlemen in Edinburgh eminent for their photographic knowledge, and who, by mutual arrangement between the painter and photographer, will have a veto on all impressions they shall consider not up to a high standard. On the other hand, it is a fact known to all practical photographers, that a comparatively small number "of the impressions come out with more than ordinary brilliance," which renders them as desirable acquisitions as are the artist's proofs of a high-class engraving; these, under the name of Selected Artist's Proofs, and properly guaranteed and signed as such, will be charged about a third more than the ordinary impressions, which, however, as has been before stated, will all be of a high class.

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Critical Notices.

PORTRAITS AND PICTURES. By H. P. Robinson. (Marion and Co.)

PICTURES BY PHOTOGRAPHY. By Valentine Blanchard.

The series of pictures before us are especially brought under our attention as examples of the work of a new form of lens designed, by Mr. Dallmeyer, with an especial view to the requirements of art, in figure photography. Great as has been the improvement in lenses since the commencement of photography, it has required a long time to produce such a lens as the instrument of the work of which these pictures are illustrations. Opticians have been very unwilling to believe that in a lens the object required was a tool suited to the production of pictorial effects. Their aim has been to meet the wants of photography just so far as these wants were compatible with recognized optical accuracy. They have aimed to get rid of spherical and chromatic aberrations, to get a perfect focus, freedom from distortion, &c., &c.; but, as a rule, they have been very shy of depth of focus, or the power to define sufficiently objects on various planes. That capacity was generally a result of spherical aberration, and as spherical aberration was technically a defect, it was of little avail for the photographer to say, "Never mind, let me have that defect; it suits my purpose." He was told that other defects followed in the same train, and that he must get his depth of focus by the use of a small aperture. But, unfortunately, a small aperture meant long exposure, and often, also, flatness and loss of relief, two fatal disadvantages in portraiture and figure photography. Mr. Dallmeyer, to whom photographers are indebted for so many optical improvements, has, however, given the pictorial wants of photographers his attention, and as all practical optics consist chiefly in a series of compromises, in which the aim is to gain the most at the least sacrifice, he has in this lens made it his especial aim to secure a large amount of depth of focus without other loss, the lens working with large aperture, consequently rapidly and without loss of relief and vigour. As to its form, it is only necessary to remark, that it is a modification of Mr. Dallmeyer's triple, in which a general modification of form is made, and very much larger negative central lens and stops are employed.

Mr. Robinson's pictures, in size 16 inches by 12 inches, are artistically and photographically some of the finest pictures which have ever graced our art. We have heard them pronounced by good judges the finest figure photographs ever produced. In them Mr. Robinson has confined himself to a walk he has made especially his own, the depicting of illustrations of character in rural life. We have here a "Market Girl," with her basket, a handsome, good-humoured English peasant girl, in rustic attire; a "Mountain Dew-Girl, Killarney," with her wooden vessel, and her roguish bright eyes, ready to dispense "mountain dew" to the tourist on his way to the Lakes, which are seen in the background behind her. In "Waiting for the Boat" we have a group of two rustic girls sitting on a bank, evidently watching the ferry-boat approaching the shore to take them over the river, which we do not see, but feel sure that is near. In all these there is most admirable composition and pictorial balance; the delicate modelling, the perfect gradation of tones, and the absence of patches of white or black without gradation, remind us much more of fine mezzotints than of anything else. There are also several portraits, groups and single figures, in all of which the most charming qualities prevail. Mr. Robinson remarks to us, that the wonderful texture which prevails, and the perfect distribution of definition in all parts of figure and accessories, is essentially due to the lens, which, he states, renders texture more perfectly than any other he ever tried. The exposure he also states to be very short, not exceeding from fifteen to twenty seconds, in a glass house, for pictures of the size we have named, defined to the edges.

Mr. Blanchard's pictures possess very similar qualities, and also admirably illustrate the excellencies of the lens. Devoted to two important branches of photography, the manufacture of collodion, and the production of instantaneous pictures, in both of which he excels, Mr. Blanchard has given us too few examples of his skill in what may be regarded as essentially pictorial photography. The "Zealot," the "Scholar," and others in recent exhibitions, have made those interested in this phase of the art look for other works from Mr. Blanchard. We have now before us three charming 12 by 10 pictures, entitled the "Ballad Singer," the "Flower Girl," and a "Pleasant Gossip." The first consists of a scene in London, where a beautiful girl is standing against the railings of a square, the foliage forming the background, and, by singing in the street, proclaiming her poverty and asking aid. We see from the face that she actually is singing, and a half wistful, half expectant glance in the eye suggests a listener at some adjoining window, from whom she hopes to receive largesse. The "Flower Girl" has the laughing audacity of conscious good looks and welcome wares. She knows her flowers will sell, and that her handsome, good-humoured face will find customers for them. In both these, the expression, arrangement, modelling, and brilliancy are highly effective, and leave nothing to desire. The "Pleasant Gossip" is an admirable composition, in which every countenance is a study. It is a group of three ladies, one of whom occupies the position of *raconteur*, and evidently details some delicious piece of gossip, with the fun of which her bonny face beams as she proceeds with the story. The others, one at each side, sit in varied attitudes of listening, enjoying the story, the demure interest of a charming blonde being especially effective. A slight movement of some of the figures, although interfering in a very minor degree with sharpness, detracts nothing from the pictorial effect of the composition. These are delicate and brilliant, excellent as examples of photography, and of the possibility (which Mr. Blanchard has always maintained) of securing sufficient intensity with an iron developer without organic additions or need for intensifying.

PHOTOGRAPHIE AU CHARBON. Par Despaquis. (Paris: Lieber.)

M. Despaquis is the present possesser of the patent in France, by M. Poitevin, for carbon printing by means of gelatine and a bichromate, obtained in 1855. M. Despaqnis is engaged in the commercial practice of this mode of printing, and may therefore be readily supposed to understand his subject. The pamphlet contains a brief history of M. Poitevin's discovery, and detail of the mode of applying it on glass, paper, canvas, ceramic wares, &c.; and also a short account of the decisions in M. Poitevin's favour, in certain lawsuits as to patent rights, against MM. Fargier and Charavet. The work will be read with interest by all photographers who have given any attention to carbon printing.

LA PHOTOGRAPHIE APPLIQUEE AUX RECHERCHES MICROGRAPHIQUES. Par A. Moitessier. (Paris: J. B. Bailliere et Fils.)

Dr. Moitessier was, if we remember aright, the first to propose, a little more than ten years ago, a method of producing photographic prints by a method which has recently been practised considerably in France, and is, we believe, the only method of printing at present employed by M. Disderi in his establishment in London. We refer to camera printing from a negative on wet collodion, and subsequently transferring the film containing the impression to paper. Although a devotee of photography, Dr. Moitessier is more especially devoted to science, and in this volume he unites his skill and practice as a micrographer to that of a photographer, and has produced by far the completest work which has hitherto been devoted to any one especial branch of photography. In a volume of upwards of three hundred pages, he treats the whole subject in minute detail. The first part is devoted to a description of the various kinds of apparatus and their management, and to a consideration of the modes of illumination, both by sunlight and all the sources of artificial light. The second part is chiefly devoted to modes of operating and the materials employed. On a future occasion we shall probably return to this work, referring to its contents in more detail, and present some extracts to our readers. At present we content ourselves by indicating its completeness. In addition to forty-one wood engravings, it is illustrated with several photographs: a stereoscopic print of the shell of the *Helix costata* magnified eighteen diameters; a fragment of the *pleurosigma angulatum*, magnified 875 diameters; and other examples, consisting of starch, blood globules, cristals, diatoms, and acari, with details of the mode of production.

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RESIN IN COLLODION.

BY WM. ENGLAND.

The method of preparing dry plates recommended some years ago by the Abbé Despratz has not yet received the attention it deserves. I venture to say that it is much the simplest method known, and the results in no way inferior to the wet process. No doubt the great drawback to its practical use has been its tendency to spoil the sensitizing bath; but this difficulty is easily surmounted, and need not prove so very great an obstacle in this otherwise very perfect process.

During some months past, I have spent considerable time in experimenting with the various resins and gums, hoping to find one that, while retaining the necessary qualities, should not be injurious to the bath; but, I am sorry to say, with no success, so far as this point is concerned.

My attention was next drawn to the rectifying of the bath itself, after deterioration. In this there is no difficulty. I imagine I hear some of your readers ask: "Why practise a process beset with such a difficulty, when so many dry methods are before us which are not open to this objection, and which processes are everything that can be desired—at least, so their advocates say?" But this process has merits of its own, and one in particular, which some dry methods are strangers to; viz., simplicity. In sensitiveness it is not inferior to any, and the keeping qualities I believe to be almost unlimited. Another advantage, not to be despised, is the tone of the negative, which is so precisely the same as wet, that no difficulty is found in judging of the right amount of intensification it should receive.

I think, perhaps, that the principal reason the resin process has not found more admirers may be found in the fact that, as originally given by the Abbé Despratz, pyrogallic acid was used for development. The exposure was found to be very long; considerably more than was required for most other dry processes. If, in the place of pyrogallic acid, iron be used, the time is scarcely one-third, and the results much softer and more delicate.

In as few words as possible I will give you the mode of working which, in my hands, has produced the best and most certain results. Prepare the collodion by adding to ordinary bromo-iodized collodion two grains of bromide of cadmium and two grains and a half of common resin to each ounce of collodion. It will readily dissolve by shaking the bottle a few times. Allow this to stand an hour or two, and, when required, coat the plate and sensitize in a bath prepared in the ordinary way, and containing a full amount of silver (say forty grains to the ounce) and about four drops of nitric acid to each pint of solution. The plate should stay in the bath not less than five minutes. After its removal, wash the plate moderately well, for about half a minute, under a gentle stream of common water, and finally with a little distilled water. The plate may now be placed to dry spontaneously or by gentle heat. No preservative being required, one of the difficulties and uncertainties of dry-plate photography is left out. The time of exposure in the camera may be very readily determined by one or two experiments. It should not exceed double that of wet plates. Before developing, it is advisable to run a little varnish round the edges of the plate with a camel-hair pencil, or the film is apt to get loose. Slightly wash the dry plate, and pour over it the ordinary iron solution, letting it well penetrate the film. Pour off into the measure, and add two or three drops of a 30-grain solution of silver. Proceed again with the development, and the picture will make its appearance almost as rapidly as a wet plate. Viewing it by transmitted light, the details should all be well out ere washing off and proceeding to intensify with pyrogallic acid; or, should it be found that the plate has been rather under-exposed, the first development may be continued by the gelatino-iron solution, after as much detail as possible has been brought out by the ordinary iron. In fact, this mode of development enables one to give very short exposures. Ten seconds I have found quite sufficient for a portrait in a glass-room with moderate light. The fixing may be done with either cyanide or hypo, in the usual way.

Now a word or two on the subject of the bath. See that it is in good condition by trying a wet plate before preparing the dry, or failure will be the result. After having passed two or three dozen plates through the bath, it may show signs of fogging; therefore, after each batch of plates is prepared, a few drops of ammonia, or solution of carbonate of soda, and a few drops of a solution of cyanide of potassium, should be added, and the bath placed in the sun till wanted again, when, after filtering and adding a few drops of nitric acid (just sufficient to make it slightly acid), it will again be found to work perfectly. This method may be adopted from time to time as may be found necessary. Where a large number of plates is required, two baths may be used, so as to have one or the other continually exposed to the sun. This "doctoring" of the bath may be thought very troublesome, but in practice I have not found it so. Probably Mr. Cooper, who has already worked with resins, or some other experimentalist, may discover some substance which may give the necessary qualities to the collodion without exercising a baneful effect upon the bath. The whole of the resins I have tried—such as amber in chloroform, mastic, copal, Canada balsam, guaiacum, &c., &c.—have all the same effect, both on the bath and the results obtained. No doubt they act mechanically in breaking up the structure of the film and giving it the necessary qualities to receive the developer.

A WORD OR TWO ABOUT ENLARGEMENTS.

BY A PRACTICAL MAN.

An artist subscriber to the News complains of his many troubles in regard to enlargements, and wishes operators in that line to do them on approval. This appears to me rather unreasonable, and a point not at all likely to be agreed to. A very small matter of experience will suffice in enabling an artist to select the proper kind of negative likely to yield a tolerable impression. But the point on which I think the great mistake is made, is that of enlarging too much; many negatives that would come out passably on paper 15 by 12, are *haziographs*, particularly as regards the eyes, when forced up to 30 by 22. Now, as enlargements are destined, at no very distant time, to become popular and in great demand, I would suggest the plan of operators commencing with smaller ones, and as they get skilled by experience and practice, fly to higher game. A 15 by 12, if placed under a broad margin, cut out, mounted, with suitable frame, will make a good 22 by 17, or 24 by 19 picture outside measurement. Now this, in a good light, on a parlour or drawing-room wall, will look satisfactory and of consequence. And further, as a general rule, enlargements should never be shown in the rough, but kept studiously out of sight until *tinted! mounted!!* and *framed!!!* A little attention to these matters would make things far more pleasant, and save a large amount of vexation, ill-feeling, and disappointment.

DESCRIPTION OF A SELF-REGISTERING PHOTOMETER.

BY T. G. BARLOW.*

The subject on which I propose to offer a few observations is the application of one of the most brilliant discoveries of the age, photography, to photometry in such a manner as to produce a permanent and accurate record of the illuminating power of the gas, either as it is delivered into the gas-holder, or as it issues from the gas works. We are indebted for the instrument by which these results are obtained to the combined labours of Mr. Kirkham, of the Imperial Gas Works, at Fulham, and Mr. Sugg, of Westminster, who, aided by Mr. Glaisher, of the Royal Observatory, at Greenwich, have for some time been engaged in perfecting, in its details, the instrument I am now about to describe.

[Mr. Barlow's paper briefly describes the photometers hitherto used in estimating the value of gas, and then proceeds.]

Twelve months ago the idea struck Mr. Kirkham that the indications of the photometer might be recorded throughout the hours of the day and night by means of photography, and thus be made to give, as it were, a chart of the illuminating value of the gas supplied to the public, or made during each hour's working. Mr. Sugg associated himself with him, and the result of their united labours is the registering jet photometer now before you.

A close box, rectangular on plan, to which no light can enter when the door is closed, except through the windows, filled in with red-coloured glass, is fitted on one of its sides with a jet photometer, and on the opposite side with a photographic camera. The back of the photometer is fitted with a piece of brass, having a slit in it about an eighth of an inch wide. Crossing this slit externally, at certain intervals from bottom to top, are pieces of wire, intended to produce the lateral marks upon the registering-plate where affected by the light of the illuminating power jet. A short distance below the lowest of the wires a prism is fixed in a vertical position, in the same line with the jet. This prism is also provided with wires placed laterally across it, and their use is to produce the lateral lines upon the registering-plate on that part where the pressure at the point of ignition of the jet is recorded.

These wires are fixed at regular intervals, and the distance between each corresponds to 1/10th of an inch of pressure. The base line is at the top, in order that the distance between the jet registrations and the pressure registrations should be constant, and for convenience.

The pressure on the illuminating power jet is maintained by means of a double governor, and a very delicately balanced King's pressure-gauge is provided, through which the gas flows to the jet, so that the least variation of pressure, even to less than the 100th of an inch, is plainly perceptible. The importance of these arrangements will be immediately perceived when it is considered that the entire success of the experiment depends upon the gas being made to issue at a uniform pressure. The pressure-gauge is also provided with an apparatus for altering its water-level without opening the door of the photometer. This is simply a solid plunger closely fitting to the inside of a cylinder, the middle of which is level at the true water-line of the pressure-gauge. Above the plunger is fixed a screw, which either raises or depresses the plunger, and produces a contrary action on the water-line of the pressure-gauge, so that the pointer can be brought to the zero point with speed and accuracy. If it were necessary always to open the door to do this, the sensitive plate might be spoiled by the action of daylight or strong gaslight.

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* Read before the British Association of Gas Managers, Thursday, May 24.

The jet, having been turned on, lighted, and adjusted to its proper pressure, shines through the aperture at its back, so that its image is clearly reflected through the lens on to the registering-plate, the lateral wires showing its height.

These indications would, however, be quite useless unless it was certain that the pressure had been maintained at its proper standard, and to give this information the prism before spoken of is employed.

A light adjusted by means of a double governor, similar to the one employed for regulating the pressure on the jet, is made to burn in such a position that its rays may fall upon the side of the prism, and, by refraction, pass through it, throwing its rays on to the lens of the camera, by which it is in turn transmitted to the sensitive plate.

In order to show what pressure is indicated by the pointer on the dial of the pressure-gauge, the following means are made use of:—

On to the shaft which carries the pointer is fixed a small grooved wheel, exactly corresponding in diameter to another and similarly grooved wheel, fixed about four inches above and perpendicular to it, so that a light silk line may run over them both. This line, being attached to one part of the periphery of the lower wheel, is made to pass over the upper one, and its remaining end is tied on to a small weight; thus, the motion of the lower wheel is exactly imitated by the upper one, and this upper one, being provided with a cycloid fixed to its shaft, it follows that any portion of a revolution of the main-shaft of the pressure-gauge may be made to cut off the light shining through the prism to any degree, according to the rising or falling of water in the pressure-gauge cistern.

When the gas is shut off from the pressure-gauge, and the pointer falls to zero, the cycloid cuts off all the rays passing through the prism except a thin line, which is the base-line shown on the plate. Any alteration in the thickness of this line will show whether the pointer was above or below zero, and exactly how much to the 100th of an inch, and when the jet is lighted, how much pressure is on it, for there will be as many spaces as there are 10ths of pressure shown on the gauge. In order, then, to get a satisfactory plate, the photometer-jet should not be lighted for one hour at starting, so as to give the pressure-jet an opportunity of recording its base-line, and the photometer-jet should be turned out on the 23rd hour (*i.e.*, eleven o'clock), to show that the water-line of the pressure-gauge has not been interfered with, or if, from any cause whatever, it has varied, then to what extent. The adjustment of the cycloid can easily be made, when the photometer-jet is turned off, by means of the small mirror fixed in front of the pressure-gauge opposite the zero line.

At such a distance from the back of the jet-photometer as will be sufficient to produce the image of the jet and pressure-gauge quarter full size upon the sensitive plate, is fixed a No. 3 Ross's lens, with arrangements to enable it to work with a small actinic power; because although the image it has to reproduce is shining directly on to the lens, yet the actinic power in the gas-flame is so small that, without such a lens, the rays would not have time to affect the silver on the plate sufficiently to make a good negative during the time occupied by the plate in traversing the point where the image falls.

Within the focus of this lens is laid down a brass rail, and upon that the slide containing the sensitive plate is made to roll by means of a small lever clock fixed immediately above the slide, and gearing with it by means of a rack on the slide and a toothed wheel on the clock. A simple arrangement of a lever with a roller on it working into a groove cut in the top of the slide serves to connect it with the clock and keep it in its place. From the top to bottom of this slide are stretched wires which divide the plate into 24 hours, and as each of these pass across the point where the images of the jet and pressure-gauge fall on the plate, it leaves its shadow-mark on the plate, producing the vertical lines, which are hours.

Between the jet and the pressure-gauge on the photometer-side will be seen a small prism illuminated by the rays of the pressure-jet, and the image of this prism falls on the sensitive plate between the base-line of the photometer-jet and the base-line of the pressure-gauge. The office of this prism is to illuminate the stencilling-plate carrying the numbers of the hours and the date of the month and year during which the record is made.

The plates made use of for obtaining the information required are those known as Dr. Hill Norris's dry stereoscopic plates, and they are prepared in the following manner:—A clean glass plate is coated with ordinary iodized collodion, and immersed in a bath of nitrate of silver. After remaining some minutes in the bath, in order to allow the silver in the bath to form the iodide of silver upon the glass plate, by combining chemically with the iodine contained in the collodion, it is withdrawn, and washed upon its surface with a small quantity of distilled water, in order to remove any free nitrate of silver which may be floating about on it. After standing for a short time to drain, it is coated with gelatine, so as to secure the iodide of silver, and prevent dust getting to the collodion film.

These plates, when dry, are sensitive to the action of light, and must be packed away in a dark place, or in a place where no light can fall upon them except through the medium of a red glass, through which the actinic power of light will not pass at all.

Now, although the collodion film, while wet, would be readily affected by the rays of a candle even, yet, when prepared for dry plates, it is not possible to make them retain their sensitiveness to such an extent, and therefore it is that a lens is required whose chemical power shall be as great as possible, so as to act upon the plate in the shortest possible time.

The process of developing the plates after their exposure is as follows:—When taken from the slide no mark is perceptible upon the plate, because although the silver contained in the film is changed in its nature by the action of the light, yet the effect of this change will only be apparent when it is brought into connexion with some organic substance which shall, in combining with it, change its colour, at the same time leaving without change that portion of silver not touched by light.

The substance most easily and inexpensively employed for this purpose is gallic acid, of which a solution is made by simply filling a bottle with distilled water and throwing into it some gallic acid till the water is saturated, ensuring always that it is so by taking care that some grains remain at the bottom of the bottle.

To make this solution with cold distilled water it is requisite that the water should remain in contact with the acid at least twenty-four hours. Two ounces fluid of this solution is poured into a glass dish, and to it is added fifteen drops of a solution of nitrate of silver—twenty grains silver to one ounce of water. Into this the plate, after being taken from the slide, is immersed, care being taken that the immersion be done so that the solution contained in the dish flows over the plate immediately, without leaving any dry places.

After about a quarter of an hour the image will be seen upon the plate, or, in photographic language, "the image will develop itself in all its details, under the influence of the developer." It will only then be necessary to increase the intensity, or, in ordinary words, to make the image blacker, by adding about fifteen to twenty drops of the same solution of silver to the developing solution in the tray; about a quarter of an hour or twenty minutes will be quite sufficient, and if it is not required to print from, the plate may be washed with a little water and allowed to dry.

To use the plate for copying, it is first necessary to remove the iodide of silver which has been unaffected, and this is done by immersing the plate in a bath of hyposulphite of soda or cyanide of potassium, both of which will remove the iodide not touched by the light, without in the least injuring the picture. The plate should then be varnished to protect it from injury, and this is done simply by pouring a little prepared varnish on to the glass so as to cover it, and letting it run off into the bottle again.

The paper for printing upon is that known as "papier Saxe," and is prepared somewhat in the following manner:—A piece of paper is floated on a solution of chloride of barium, and afterwards upon a solution composed of distilled water and white of egg, which gives it a glazed appearance.

Prepared in this way, it is to be obtained of any photographic chemist, and in this form it is quite insensitive to the action of light, and to prepare it for printing it is only necessary to float it on a bath of nitrate of silver solution containing about sixty to eighty grains of nitrate of silver to one ounce of distilled water, and hang it up by one corner in a dark room or box till it is dry. When dry it is laid on the negative with the prepared side of the paper facing and touching the face of the negative. Both are then put in a printing-frame, and exposed to the action of daylight or sunlight till the edges of the paper become quite bronzed. Then the paper is removed, and after being well washed with common water to remove any untouched silver which is soluble, leaving behind on the paper that portion of silver upon which the light has shone, which has become insoluble, it is immersed in a bath of distilled water, containing a small portion of chloride of gold, which has the property of giving a tone of either deep chocolate, brown or black, according to the quantity of the gold employed, and the time during which it has been allowed to remain in the bath. It is then taken from this bath and immersed in a bath of hyposulphite of soda till the paper appears clear upon holding up to the light, after which it is thrown into hot water, and allowed to remain till all the hyposulphite has been dissolved out of it, and thoroughly removed. Should any remain, it will crystallize upon the paper, and finally destroy the picture.

This process, although when described at length appearing complicated, is in reality extremely simple, and such as may be performed by any ordinary person, perfectly, with a few hours' practice.

In the development of the plate, it will in practice, however, only be necessary to immerse the plate in the developing bath, and allow it to remain shut up in the box till it is done; no harm would result if it were left all day in this bath.

It is, of course, large establishments only that can avail themselves of such instruments, the chief practical value of which is to disprove, by unquestionable evidence, the statements of trading agitators who habitually misrepresent, or unskilfully conduct, experiments on the illuminating power of gas, and who obtain some credit because the details of no concurrent counter-experiments can be produced to contradict theirs. In such establishments photographic photometers must henceforward be as necessary as pressure registers.

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DETECTION OF METHYLIC ALCOHOL.

Mr. John T. Miller, writing in the *Pharmaceutical Journal*, says:—"The following modification of my process for the detection of methylic alcohol may be used when it is wished to avoid distillation. It is easy of execution, and gives very fair results. Prepare in a small flask an oxidising solution with twenty grains of bichromate of potash, three fluid drachms of water, and twenty minims of strong sulphuric acid, and add to it thirty minims of the spirit to be tested. After the mixture has stood ten minutes, add just enough milk of lime to give it an alkaline reaction; warm, filter, and wash with half an ounce of warm water. The filtrate will be free from chromic oxide and the greater part of the sulphuric acid. Precipitate the remainder of the latter, and any chromic acid which may be present, by the addition in small excess of a strong solution of acetate of lead; warm slightly, allow a few moments for the precipitate to subside, and filter. The filtrate should now be clear, colourless, and nearly neutral to test-paper. Boil it quickly down to two fluid drachms, pour it into an ounce test-tube, add one drop of dilute acetic acid (one part of the B.P. acid to two parts of water, and one grain of nitrate of silver in thirty minims of water; then heat the liquor slowly to the boiling point, and *simmer* two or three minutes. Darkening of the solution to a considerable degree may occur even though the spirit be free from methylic alcohol, and is therefore a less reliable indication of the presence of that substance than when the oxidation products have been separated by distillation. The state of the test-tube will, however, decide the question. It should be rinsed out, filled with water, and placed against white paper. If it appear clean and uncoloured, the spirit is either pure or contains less than two per cent. of methylic alcohol; if, on the other hand, the lower part of the tube have an evident brown tint, the spirit is methylated. To obtain satisfactory results by this process the points to be minded are:—1. To use distilled water. 2. To add only a slight excess of the precipitants. 3. To use a perfectly clean test-tube. 4. To avoid boiling the liquor up to the tube, and so thinning the metallic deposit by spreading it over a large surface. I have tried various oxidizing agents, but have found none better or more manageable than bichromate of potash.

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Recent Patents.

IMPROVEMENT IN DARK TENTS.

BY JAMES WILLIS.

In the dark tent here described, the principle of the umbrella has been rendered available for expanding the cloth by means of a framework with ribs of steel. It is described as follows:—

This invention has for its object improvements in the construction of portable dark tents or chambers for photographers. For these purposes a number of ribs, by preference of steel, are used. At the upper ends they are attached to the top notch of a tube capable of sliding on a rod or stick. The lower ends of these ribs are pin-jointed to the outer ends of stretchers, the inner ends of which are attached to a notched ring fixed on a tube or runner, which is capable of being moved up and down freely on the stick or rod, so that when this tube is slid upwards the stretchers and ribs will come towards the stick or rod, and when the tube is at its highest position the stretchers and ribs will lie against the stick or rod. At the upper end of the stick or rod is fixed a top notch, in which the ends of suspending wires are attached in like manner to that in which the ends of the ribs of umbrellas are attached to the top notch of an umbrella; or these suspending wires may be otherwise attached. These suspending wires are at their other ends pin-jointed to the ribs at some distance from where the upper ends of the ribs are attached to the upper sliding tube; hence, when such tube (to which the upper ends of the ribs are attached, yet so as to move freely) is slid down a short distance, and the lower tube to which the inner ends of the stretchers are attached is slid to its lowest position, the ribs will be suspended from the top of the stick or rod, and will take a curved form like the ribs of an umbrella. In this manner may the frame of a dark chamber or tent be formed, which will fold into a small compass, and be comparatively light. It is preferred that a tent should not exceed from a quarter to one half of the circle. The stretchers form, when opened out, a horizontal frame, which, being covered, forms a surface on which a sink and other vessels may be placed. The frame is covered with a fabric lined with black cotton, velvet, or other fabric capable of preventing the passage of light into the interior of the tent or chamber. An apron is formed to the tent suitable for surrounding the person, as has heretofore been the case with other forms of portable tents, or dark rooms or chambers. Light is let into the tent through yellow cloth or fabric inserted at suitable parts of the tent, as has heretofore been the case.

PHOTOGRAPHING ON COPPER.

BY F. R. WELLS.

The want of novelty in the following idea doubtless led to its abandonment, and it only received provisonal protection.

This invention relates to a new or improved method of producing a photographic image on the surface of a plate of copper or other metal, the object being to etch or engrave thereon. I propose to sensitize the plate by the vapour of iodine or the fumes of bromine, or with iodine combined therewith, when a photographic image can be produced thereon and developed by heat or by the fumes of mercury. A picture or engraving, or any picture or drawing, transparent or semi-transparent, can be produced on the surface of the plate to serve as a guide for etching or engraving thereon, so that facsimiles can be produced. In some cases the solution of iodine or bromine may be used in lieu of vapours.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 27th June, 1866.

The employment of resin in photography has been known for several years, and the much lamented Abbé Despratz was the first who made use of it in collodion. At present this substance is being introduced in the printing process, and will thus become of more extensive application.

Mr. Taylor has just presented to the Photographic Society at Marseilles, a method by which he substitutes a paper prepared with shellac instead of albumen. At first, it occurred to us that the sizing in the paper, and particularly the resin, had been often deemed the principal causes of those defects of which photographers have so frequently complained. The employment of a resinous matter, well manipulated, and forming a sizing, appears to us of a nature to obviate those defects which compromise the success of the printing process.

[Full details of this printing process, communicated by Mr. Taylor for the benefit of our readers, will be found in our number for June 1st, page 256.]

If a sheet of paper prepared with shellac be plunged in a solution of any salt not having the property to dissolve shellac, this resin is generally coagulated, and the salt used to dissolve it is mixed in the bath by diffusion, and is replaced partially by the salt of which the bath is composed. This fact enables us to substitute other salts for those which had served in the first preparation of the paper, and to modify afterwards the composition of the sensitive coating.

The experiments made, especially with the chloride of ammonium, have given very remarkable results in case of need. The coating of shellac can give to the paper a shining surface like that of albumen, but this brightness, generally so disagreeable with the latter, is easily avoided in the methods described, and that without injury to the vigour of the picture produced.

In the study of this new method of photographic printing, the degree of permanence which the picture possesses is most naturally a capital point of interest; for, having for base the nitrate of silver, it can only be ascertained by the experience of many years. The author thinks, however, that the results already obtained, and the nature even of the method he proposes, give a system of printing that offers serious guarantees.

The author has employed his method of shellac for three years, and many of his proofs have been only imperfectly washed, so that their duration could only be of secondary consideration. However, none of these proofs, even the oldest, show any signs of deterioration, and their whites are as pure as those of recent proofs.

Shellac is a substance so unlikely to alter by atmospheric influence, that it is not doubtful that the permanence of photographic pictures, with the base of silver, will be much increased by the substitution of this resin for so unstable a body as albumen.

When the proof is obtained and fixed, it may be considered finished; but another security, by a last operation, may still be obtained. This consists in the application of an alcoholic solution of shellac, with an artist's brush, which penetrates the thickness of the paper. This sort of varnish, well prepared, does not make the surface of the paper shine, as might have been feared, but makes the picture more vigorous and less shaded; while, as a means of preserving it, it is probable that the picture being thus, as it were, hermetically covered with the resin, this last operation may have an excellent effect.

To prevent the absorption of the sensitive coating in the thickness of the paper, before the application of the coat of shellac, the paper may be saturated with the resin dissolved in alcohol; but this is by no means necessary, and even its utility is contestible.

On sending the Report of the Marseilles Society upon the new salts of M. Meynier, M. Vidal says that he has made experiments, and particularly with the salt of iron, and the results have been excellent.

M. Vidal, who is occupied actively with pisciculture, has undertaken a series of very interesting microscopic reproductions of fishes' scales. This album, very curious in a scientific point of view, will be shown at the next Agricultural Exposition at Arcachon.

The Imperial Commission for the Universal Exposition of 1867 has notified to the delegates of the photographers, that the part of the building reserved for them will be delivered to the workmen charged with the execution and installation in the second fortnight of July. This may give some idea of the point arrived at in the constructions at the Champ de Mars. As soon as we are in possession, we shall commence our labours, and it is probable we shall not be the last installed. Ernest Lacan.

FOTHERGILL PLATES: SHORT *v.* LONG EXPOSURE.

Dear Sir,—As you have often expressed a wish, through the medium of your journal, that any matter connected with photography, which would assist others, should be noted, I beg to offer a few remarks. Having recently been a short distance from home, where I knew I should find several good subjects as stereographs, I accordingly prepared eighteen plates; twelve by the formulæ given in the Almanac for 1865, as practised by Captain Bonamy of Jersey (and by which I have seldom had a failure), the remaining six by Gordon's modification of the Fothergill process, giving the latter two-thirds less exposure than the former on the same subjects. The plates were prepared at the same time, and developed on the day after my return, three days having elapsed after exposure before development. My old love proved faithful in every respect, whilst the Gordon modification turned out utter failures.

I should therefore advise tourists not to trust to the Gordon process if they wish to get good negatives, as in my case decomposition seems to have taken place *after* exposure. I have prepared, altogether, about twenty rapid plates, and never succeeded satisfactorily.—Yours truly,

An Old Photo.

[Increased experience has convinced Mr. Gordon that the process we described will give much more rapid results than he at first believed; but it has also convinced him that the plates do not keep long. For a week he can rely upon them; if kept a fortnight, he would very much increase the exposure; and for a longer period he would hesitate to trust to them at all. In cases like that mentioned by our correspondent, we should always counsel trusting to the process which has been mastered, and to test, not only the new process, but the operating mastery over it, before trusting to it for actual results.—Ed.]

THE ACTION OF LIGHT ON SALTS OF SILVER.

Sir,—I see by recent numbers of the News, that Mr. Carey Lea continues to press hard upon the advocates of the chemical theory of the action of light on the haloid salts of silver. This is a subject to which I have, at various times, devoted much attention; and, if you will permit me, I will state the conclusions at which I have arrived.

About fifteen months ago I determined to try the behaviour of these salts under a much more intense light than had, I think, before been used. I had constructed a silvered glass speculum, capable of concentrating the sun's rays about eight thousand times, and of instantly fusing and igniting fine steel wire. In using this apparatus, it became necessary to cut off the rays of heat. The only efficient way of doing this I found to be to expose the iodide, &c., under water, which, by boiling away, prevented the heat affecting the results, the chemical force remaining undiminished. By experimenting in this way, many interesting results were obtained. After much experimenting, I was led to adopt the following theory, which I now offer for the consideration of your readers :—

The action of the chemical rays upon a haloid salt of silver is to *increase* the affinity of its elements for each other. and, at the same time, to render it an acid salt greedy for more base, which it will take from any substance, solid or liquid, capable of yielding a base with which it can combine.

In the case of chloride of silver, the particles first acted upon by light seize upon the particles underneath, taking away other silver, and setting free their chlorine.

With bromide of silver the action is the same as with the chloride. Thus chloride and bromide of silver *act as sensitizers to themselves.*

In the case of iodide of silver, the particles acted upon by light have not sufficient affinity for more base to decompose those unacted upon; but should a chloride or bromide or solution of an oxide of silver be present, the iodide will seize upon it, taking away its base, and setting free the other element. Should no substance be present capable of yielding a suitable base, the iodide will still retain its affinity during a short time after exposure to light; and an image may be developed by an after application of a sensitizer and developer.

I will just mention a well-known experiment which, I think, confirms this theory; viz., a mixture of hydrogen and chlorine exposed to light. Hydrogen, we know, in all its combinations, acts as a metal, and when the mixed gases are exposed to the chemical ray, they instantly combine, because their affinity is increased by it.—Yours, &c.,

June 23rd, 1866. Onward.

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Photographic Notes and Queries.

Enlargements.

Sir,—As the views I have so frequently expressed on enlarging were last week fully endorsed by other correspondents, will you kindly allow me to make a few remarks on one or two points which seem to arise from those letters? The opinion of Mr. Sydney Smyth is entitled to the highest consideration, as he is an old and skilful operator by solar camera; but I think he entirely mistakes the intention and scope of the matter when he says, "there can be no doubt a special negative is required for enlarging." If this were really the case, the field would be extremely limited. Few persons will actually sit for an enlargement. The very large majority are ordered from old negatives of deceased persons, or else from glass positives, or Daguerreotypes. These pictures produce enlargements which are only presentable when the skilful artist has, by judicious manipulation, removed the objectionable parts, heightened and strengthened the likeness, and infused a feeling of art into what was simply a crude cartoon.

Once again I repeat, that it will lead to hopeless failure to attempt to persuade people to have untouched enlargements, no matter how fine they are.

To my own knowledge, that eminent portraitist, Mr. T. R. Williams, spent a great deal of time and money in the attempt to produce such pictures, only to abandon it as a useless expenditure of both. Negatives of the highest qualities were employed.

By the negative process of enlargement, any kind of negative can be used successfully, whilst for the solar camera, or Dr. Monckhoven's, a special plate must be taken. By the former process, any negative in stock can be employed; for the latter, a person must sit specially. I assert, as my belief, from a most careful inquiry into the matter, extending over several years, that if photographers really expect to be able to induce the public to take up with enlargements, it will be by the aid of the negative enlarging process, and competent artists to finish up the results. Samuel Fry.

Enlarging.

Sir,—Allow me again a space in the News, in reply to one of your correspondents. I will take him on his own grounds, and ask him if he ever heard of a person paying for a dinner before he had it? If such a dealer supplied unwholesome food, I say, not only that he should not be paid, but that he should be severely punished for it.

I now leave this part of the subject. On the quality of negatives, I consider the authority of Mr. Sydney Smyth as final. It is more certain to my mind that much more may be done with ordinary printing negatives. It only requires judgment and common sense. Enlarging is something like printing. You may destroy the best negative by bad printing; so you may obtain a detestable thing by enlarging, if you do not hit the time of exposure. A comparatively poor negative may be made presentable with description to an artist.

Now, Mr. Editor, I have an idea that if some clever practical man would devote himself entirely to this branch of the art, and not go into the general line, that he would succeed perfectly. It is a separate branch. I say it advisedly. I know something of the harrassing nature of photography, and feel certain that no man can succeed unless he devote himself exclusively to this department.

Thanking you, Mr. Editor, for your kindness in ventilating this subject, and as a medium for expressing one's feelings on matters artistic and photographic. I have written with no angry feelings, but I do love justice. An Artist.

Developing Powder.

Sir,—Having noticed, in the last number of the News, that a weekly reader had received no answer from me, I beg to state that he may have not received it, but I did send him one (containing another sample) a few days after I received the account of his bad luck.

I regret that this correspondent or any other should have thought for a moment that I would be satisfied to send a useless article.

As I wish sincerely that your correspondent may succeed, I forwarded him a third sample yesterday.—I remain, Sir, yours truly, A. De Latour.

28, *David Place, Jersey, June* 18*th*, 1866.

[It is only fair to M. De Latour to say, that we have received many testimonies to the excellence of his invention, as well as the complaints to which we have given publicity.—Ed.]

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Talk in the Studio.

New Feature in Banking.—A gentleman recently called at one of the banks in Brisbane, and presented a letter of credit for a considerable amount from a Melbourne bank. The usual plan adopted by the banks in such cases is to require the party presenting the letter to get a customer of the bank to identify him, but in this case such a requirement was unnecessary, as the manager of the bank held a *carte de visite* of the gentleman referred to, which served the purpose of identification, and the money was at once placed to his credit.—*Warwick Argus.*

Photography and Garibaldi.—Mr. G. A. Sala, in a recent letter in the *Telegraph*, has a graphic word-photograph on Garibaldi, in commenting on the sun-pictures of the Italian hero. He says :—" Photography has not done him justice. The sun, like calumny and the calumniator's favourite weapon, the frying-pan, blackens all with whom his rays, through the medium of the camera, come in contact. In the cartes de visite Garibaldi looks sombre, meagre, and worn. I was surprised to see a hearty, jovial man, with a great blonde beard. But for the eyeglass he used, and the stick he carried, there were no traces visible of the waves of time which have dashed against him, or of the cruel bullet which struck him at Aspromonte. He gave me his hand, and a hearty, sailor-like grip into the bargain; and if it be snobbish to have wished to kiss that horny paw, I am glad to have been, for once in my life at all events, a snob most egregious. A thousand times must it have been remarked in print that the aspect of Garibaldi is as that of a Lion. But no other simile will serve. '*Sorriso di madre, riguardo di leone,*' the Italians say of him. His port and mien are, of a truth, thoroughly leonine; but the '*sorriso di madre,*' the 'mother's smile,' comes over him when he converses familiarly, when he calls to some member of his staff, or, best of all, when he sees the boy volunteers, the hope and promise of Italy, passing before him. And there surely was never a countenance so thoroughly *translucent*, and from whose eyes there beamed so strongly the light of the soul within—the soul of a just and upright man, quietly striving to do his duty."

The Queen's Portrait for Mr. Peabody.—Photography is, we understand, chiefly employed as the aid in producing the portrait of Her Majesty to be presented to Mr. Peabody. It is entrusted to Messrs. Dickinson, of Old Bond Street. Though only half length, the painting is 14 in. long by nearly 10 in. wide. For the first time for the presentation of her portrait to a private individual, Her Majesty sat in the only robes of state she has worn since the death of the Prince Consort—the costume in which she was attired at the opening of the present Parliament. This was a black silk dress, trimmed with ermine, and a long black velvet train, similarly adorned. Over Her Mary Stuart cap is the demi-crown, while the Koh-i-noor and one rich jewelled cross, presented by Prince Albert, form her only ornaments. To complete this portrait, Her Majesty gave Mr. Tilt several long sittings, and has now expressed her unqualified approval of the water-colour shown at Mr. Dickinson's. This, however, is but the commencement of the process. The portrait is to be done in enamel by Mr. Tilt, on a panel of pure gold. In these enamel paintings, to bring out all the brilliancy of their colours, they have to be burnt in a furnace at least five and generally six times. The heat to which they are subjected is so intense as to be only short of that which would fuse gold, and the most exquisite care is necessary neither to let the picture heat too soon, nor, above all, cool too rapidly, as in either case the enamel would crack. So large an enamel portrait has never been attempted in this country. After being submitted to the Queen on its completion, it will be forwarded to Mr. Peabody, who intends to deposit it where it may be best seen in a large institution which he has founded in Boston, his native town.

Mr. Gordon's Dry Process.—The experience of our readers with this process has been varied, but in most cases successful. A correspondent, who encloses an excellent specimen, says:—"Since you published Mr. Gordon's dry process, I have been using it, and find it everything you said about it. I can get pictures with it equal to those by any wet plate, and I find the development quite as quick as in the wet process, providing the exposure be right. * * * I thought by your remarks in the News of last week, you appear to think that the plates will not keep. The plate that the enclosed carte is printed from was prepared the same week that you published the process, and it was exposed last Saturday. The exposure was carried a trifle longer than I usually expose them. I have exposed two dozen whole plates, and only two failures; and about three dozen stereo. plates, and only two failures; and I found out that these were for the want of more washing, as slight washing will not do. I feel so pleased with the process, that I do not wish for one more simple or better. I develop with plain pyro and water. I find that better than the alcohol and pyro. I get more plucky negatives with it."

To Correspondents.

J. H., Junr.—Mr. Willis's aniline process will probably suit your purpose best, as no negative is required, the drawing itself answering that purpose. You will find it described in our last volume. The process to which you refer was probably Mr. Hunt's chromatype process, upon which Mr. Willis's process is a decided improvement.

R. M.—The deposit on the shadows during the process of intensifying is not the result of reversed action of light, but of fog, arising from various causes. It generally arises when prolonged intensifying is necessary in warm weather, especially if the nitrate bath contain organic matter. Your practice of using a few drops of the silver bath in the intensifying solution will conduce to it. It is always better to use a fresh 15-grain silver solution for this purpose. The use of a weaker solution of pyrogallic acid and more citric acid will check it. But the most certain preventive is the employment, between developing and intensifying, of a solution of iodine. Mix one grain of iodine and two grains of iodide of potassium in an ounce of water. After developing with iron and washing, cover the plate with this solution, then wash and intensify. You will not, after adopting this plan, be troubled with the foggy deposit on the shadows. In cases where this red or brown deposit has occurred, the simplest remedy is the application to the finished picture of a weak solution of bichloride of mercury, which changes the colour of this deposit to a delicate white, which scarcely impedes light at all in printing. The dense portions are only slightly affected by this treatment, being made very slightly denser. The advantages of adding sugar to the iron developer are: less inclination to fog, greater density, a more non-actinic deposit, and better flowing qualities.

Kent.—The new triple portrait lens is made by Mr. Dallmeyer. It is probably not yet in his catalogue, having been only very recently perfected.

John Beck.—The only mode of getting small prints direct from large negatives is by means of camera printing, proceeding as for printing transparencies. This may be done on opal glass, but if paper prints are required, the transparencies may be printed on glass, and, after toning, transferred to paper. The mode of working described by Mr. Burgess in our last volume, and also in our last Year-Book, as suitable for the Eburneum process, will answer.

S. Smith.—A patent was entered for the production of magic photographs a short time ago. We do not know, of course, as yet, what the details may be; but the methods recently described, with bichloride of mercury and hyposulphite, could not be patented, having been made public many years ago by Sir John Herschel.

G. A. B.—Printing right out on albumenized paper will give you better prints, as a rule, than printing by development. If you have time to attend to the matter, watching carefully to keep the camera moved every few minutes, so as to keep the sun central on your lens, you may get good prints by the apparatus you describe; but you can only do this in bright sunshine. Where time is an object, or where the sun does not shine, development will answer best. The best mode to make calico waterproof is to give it a coating of varnish containing a good deal of boiled oil It is, however, a troublesome job, and the drying is slow. On the whole, except for purposes where a large quantity is required, we should recommend the use of mackintosh cloth.

Ignoramus.—The pictures by Mr. Robinson are taken by a triple, but not the ordinary triple. It is a new form of triple expressly suited to this kind of work. We cannot tell you with certainty what sized head a 15 by 12 lens would take, but one of Mr. Robinson's pictures was a head about four or five inches long, with a lens for the size you mention. 2. We approve of your resolve. One of the new portrait triples for 12 by 10 will be a very useful size, and may, without disadvantage, be used for 16 by 12. Larger pictures than that will probably be best produced by an enlarging process.

Deaf and Dumb Artist.—The use of more turpentine will make the preparation dry more quickly, or the addition of a little "patent driers." We shall be glad to hear something of your gelatino-iodide and bromide of silver process.

P. Wilkins.—Much depends on the construction of the lens, as to the quality of definition, &c., it will give; but, with the focus you mention, it is probable that it will cover a plate about 16 inches by 12 inches.

J. C.—Blackening brasswork is best effected by means of a solution of bichloride of platinum, or "chemical bronze," as it is styled. Dissolve four drachms of bichloride of platinum in six ounces of water, and add one grain of nitrate of silver. Clean the brass thoroughly, and apply the solution with a camel-hair pencil. When the effect is produced, wash, dry, and rub over with black lead.

W. D. B.—The markings you describe are suggestive of over-iodizing. You have used distilled water, we presume, in first and last washing? Sometimes the use of common water will cause such markings. 2. It is very difficult to estimate exposure without being present on the spot. We should think, from a minute and a half to two minutes; possibly more; not less.

E. W. C.—The presence of iodide of silver is usually considered injurious to the printing bath. In the small proportion you mention, it is not probable that it will do much harm. It is very difficult to remove from a nitrate of silver solution.

An Artist.—The portion of your letter which appears to be personal in its bearing towards some one, is unsuitable for our pages. We can only discuss the principles involved in such matters, not individual cases.

F. Brown.—Thanks for the attention. We publish the paragraph.

H. B. Y.—If the addition of a solution of chloride of sodium until a slight precipitate is formed do not remove the colour, try adding carbonate of soda, followed by sunning. 2. Either white or blue blinds may be used, as taste suggests, without making much difference in the result. 3. A dark grey will answer for the opaque parts at the side and over head of the sitter.

B. B.—It is probably, as you suppose, due to a little want of care in the manipulation; we have not met with such marks. The card is excellent, and you are evidently now successful. We shall be glad to see further examples. We are uncertain of the price of the lens you mention at present; but we understand that it will be reasonable.

W. H. H.—We do not know at present the form of the gallery in question, but can probably ascertain, in which case we will let you know.

X. Y. Z.—We do not remember making such an intimation. The gentleman you mention is very courteous and accessible, and would, we doubt not, willingly aid any photographer by information on his process. He leaves London, however, in a few days, and will be absent many months.

A Student.—The trace of nitrate of baryta left in the bath has been understood to give increased intensity; but we had no reason to expect either fog or loss of sensitiveness. Possibly you have added it in excess. Is the bath weak? Or have you added excess of acid? In our experience, marine glue used as a cement for glass apparatus has no injurious action on nitrate of silver solutions. We do not know of any other cement which answers so well, and we have used it for many years.

Alkali.—The prints enclosed exhibit a complication of disorders. The yellow mottled stains which appear the day after printing are due to imperfect fixation, the hypo solution being either too weak or the prints are stuck together and imperfectly immersed. The mode of proceeding in printing you describe is all wrong. Carbonate of soda should not be added to the printing bath; it will throw down silver and waste the bath, without doing any good. The bath of carbonate of soda before toning is also useless, and may be mischievous. If the bad water you have to use be boiled first, it will effect a great improvement.

W. S. Parry.—Thanks. The portraits are excellent; and the other specimens very fine indeed.

Several Correspondents in our next.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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CLEANING AND REVARNISHING OLD NEGATIVES.

With careful treatment, so as to avoid scratching or abrading the surface, or cracking the glass, it might very naturally be assumed that a collodion negative would suffer neither deterioration nor change, but that an indefinite number of prints, the last as good as the first, might be produced from it. It is a fact, however, which every photographer, who has occasion to print a large number from any one negative, knows, that it will frequently suffer a gradual change, which is most frequently deterioration. If the negative were perfect and quick printing at first, it gradually becomes more intense, yielding much fewer prints per day, and there is at the same time a gradual loss of delicacy and softness. We are not now alluding to the negatives which have been intensified with iodide of mercury, and which are well known to be sufficiently sensitive to light to become hopelessly hard by continued exposure, but to ordinary collodion negatives, developed with iron, intensified with pyrogallic acid and silver, and varnished with a good spirit varnish.

This injurious increase in opacity is probably due to two or three causes, not dependant on any change in the deposit forming the negative itself. In the first place, the varnish itself becomes darker from exposure. This is a tendency in most gum resins; they become yellow or brown under the influence of light and air, and in some instances there is a tendency to become less transparent. In the next place, by the constant contact of this surface with the silvered surface of the albumenized paper, which is occasionally, it may be, in some slight degree damp, the varnish becomes slightly impregnated with the nitrate of silver, and the pellicle of a compound formed between the silver and the resin becomes darkened by the action of light, forming a non-actinic veil over the negative. In some negatives which have been long printed, a slightly metallic looking coating may be detected by the eye; in others there is merely a somewhat browner tint perceptible. At the same time the surface has been gradually acquiring particles of dust and flue, and the resulting print lacks both the delicacy and the cleanness of those which were yielded by the negative at the commencement.

This, with valuable negatives, is a somewhat serious consideration, for in the direct ratio of its value it often happens is the necessity of constant printing, and therefore of deterioration. A negative in this condition has usually been regarded as hopeless, and its gradual depreciation in value looked on as the inevitable result of wear and tear. Constant use must, of course, necessarily tend to wear out everything, abrasions and other mechanical injuries being more or less unavoidable. But the deterioration to which we have referred, which is one of the most serious evils the photographer printing large numbers from his negatives has to contend with, is not without a remedy. Our attention has recently been called to the matter by Mr. England, in whose extensive operations many valuable negatives had, in the course of years, become comparatively hard, coarse, and slow in printing. A variety of experiments were therefore tried, with a view to restore the original qualities, and finally with complete success.

Mr. England found a very simple remedy quite efficient. It consisted in washing away the old varnish with alcohol, and revarnishing the negative. The attempt to revarnish a negative which has been coated with a spirit varnish has generally been regarded as a dangerous operation; but if a few precautions receive attention, it may be done with little risk, and much advantage. Ordinary rectified spirit will answer best; if absolute alcohol or spirit of very great strength be used, there is risk of dissolving the film. With methylated spirit of sp. gr. 805, the risk is very great, as this is a solvent for many kinds of pyroxyline without the addition of ether. If methylated spirit be used—and it will answer the purpose well—it should not be stronger than the ordinary samples sold as about 60 over proof. If much weaker than this, it will not readily dissolve the varnish; and stronger, it may, with some samples of collodion, dissolve the film. With ordinary rectified spirit, or the methylated spirit commonly sold, there is no danger. After flooding the plate with the spirit, and leaving it on the varnished film a few minutes, it will be noticed, on pouring it off, how brown the varnish is which it removes; and on adding a soluble chloride, the presence of silver will be manifested by a precipitate of chloride of silver. The spirit, after pouring on and off a few times, should be set aside, and a fresh portion of clean spirit applied, and after treating with this, the plate may be revarnished. Mr. England remarks that he has been astonished at the perfect renovation of a negative by this process, all the original delicacy and purity being perfectly restored. He has noticed a further fact, that on the continued use of the same portion of spirit for several negatives in succession, the nitrate of silver dissolved in it, permeating the film of those last done, has produced a palpable intensifying action, the action of light and the presence of the organic body in the alcoholic solution evidently causing a reduction of the nitrate of silver present on the image. Where it is important to avoid giving any additional intensity, it is desirable, therefore, to avoid the repeated use of alcohol in which a portion of nitrate of silver and resin have gradually been dissolved.

Where it is desirable to give the varnished negative increased intensity, as it sometimes happens that in printing it is found that a negative is less vigorous than it was deemed to be, Mr. England finds the same mode of proceeding completely successful. After removing the varnish by alcohol, he proceeds to intensify by the application of an alcoholic solution of pyrogallic acid and citric acid to which a few drops of an aqueous or alcoholic solution of nitrate of silver have been added. The intensification proceeds rapidly and evenly, the result being as perfect as when aqueous solutions are used in regular course.

Where negatives become too intense, from having a darkening of the deposit by which they were intensified, the removal of the varnish may effect an improvement, but will not in itself restore the negative to its original softness. But the varnish being removed, the film may then be more readily treated with those reagents which may restore the delicacy of the image. In the case of the iodide of mercury, for instance, the deposit may be partially removed by treatment with alcohol, in which it is to some extent soluble. It is better even when the varnish is removed to avoid treating the film with aqueous solutions, but alcoholic solutions may be applied without difficulty, and with perfect success.

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ELIMINATION OF HYPOSULPHITES FROM PRINTS.

In the decomposition which arises in the methods proposed by Mr. Hart for the elimination of hyposulphites from photographic prints, when oxygen is liberated, free chlorine or hydrochloric acid is also produced in the water,[*] and when chlorine comes into contact with a film of finely divided metallic silver, like that forming the image, it rapidly acts upon it, producing chloride of silver. This fact, at first sight, very naturally suggests the advent of a new danger to the print in getting rid of an old one, and apprehensions have been expressed that the print will be inevitably reduced, and that to a greater degree in the half-tone, by the action of chlorine on the print, forming white chloride of silver.

The same objection is true of peroxide of hydrogen. The trace of hydrochloric acid present, and necessary for its preservation, even in solution containing ten parts of water to one of the commercial solution, produces palpable bleaching action on the prints immersed in it. Even if it were prepared entirely free from hydrochloric acid, unless it were used with distilled water, and the prints washed in distilled water after its use, there would be danger of the formation of chloride of silver from the decomposition by chlorides in the water of the sulphate of silver left in the print, and the risk of a slight general darkening on exposure to light would ensue. For the latter contingency—the possible formation of a trace of chloride of silver in the body of the print—Mr. Hart has provided in his suggestion of a subsequent bath of dilute ammonia; and for the formation of hydrochloric acid by the decomposition of the water, he has provided by the presence of excess of caustic soda in his preparation, which would at once form chloride of sodium.

The question of the possible reduction of the prints, and the loss of half-tone, is a most important one, and must be settled rather by practical experiment than theoretical considerations. Mr. Hart, in demonstrating before the South London Society, immersed a number of prints in the solution, retaining duplicates printed to the same depth without treatment, for comparison afterwards. No change whatever was apparent in the prints which were submitted to the oxydizing solution. As the examination of wet prints by artificial light is scarcely sufficiently decisive, we have since not only seen the prints in question, but have submitted many others to very trying experiments with the hypochlorous solution prepared by Mr. Hart, with an especial view to an examination of its effect on the depth of the prints.

The strength of the preparation as supplied by Mr. Hart is not stated, but the photographer is instructed to add one drachm to a pint of water. We have tried it in a much more concentrated state, as the most valuable suggestion is obtained by the examination of extreme cases. We should here remark, that the apprehensions as to the reduction of the depth of the print are based on the affinity of chlorine for silver. The perfectly toned photographic print consists of silver protected by a deposit of gold of less or greater thickness, depending on the depth of the toning; and we find that the action of chlorine on the print is more or less marked in proportion to the amount of gold present. A deeply toned print is not affected even by the prolonged action of a strong solution of the hypochlorite, whilst a print but slightly toned is palpably injured by the same treatment. We first added one ounce of the preparation to ten ounces of water, thus using it sixteen times stronger than prescribed by Mr. Hart. Half a dozen finished prints, toned to different depths, were divided each into two portions, one half of each print being placed in the solution, the other halves being kept for comparison. After an immersion of fifteen minutes, no perceptible change was discovered; after thirty minutes' immersion, one or two of the lightly toned prints were perceptibly reduced in depth, and had assumed the well-known appearance of mealiness, being mottled with innumerable points of alternate light grey and brown. The solution was then diluted with ten ounces of water, making the solution eight times stronger than that prescribed by Mr. Hart. The same operation was then repeated, and the prints examined after an immersion of an hour. The lightly toned prints again showed traces of reduction, with the mealy effect to which we have referred, the fully toned prints showing no alteration. The latter solution, with the prints in it, was now left for twelve hours, at the expiration of which time all the prints, with the exception of one, were reduced in greater or less degree; but the reduction was no more apparent in the half-tones than in the shadows. The amount of reduction was uniform and very slight indeed, and it was accompanied always by the mealy granulation which spoiled the effect of the pictures. The one print which was not affected was one which had been toned to a deep black with gold, and in it no change was apparent after twelve hours' immersion in this strong solution.

From this it may fairly be assumed that prints toned with gold would suffer no injurious reduction when immersed for a quarter of an hour in the dilute solution proper to be employed, one-eighth of the strength of that we have just described. Of the protecting influence of the deposit of gold, we may mention another illustration. In some recent experiments in preparing the "magic photographs," recently in vogue, we prepared a nearly saturated solution of bichloride of mercury in boiling water, and immersed some gold-toned prints, as well as some which were simply fixed, therein. The latter soon disappeared, the image being partially converted into chloride of silver, and partially veiled by a deposit of calomel. The gold-toned prints were scarcely changed in appearance by the time the solution had cooled and the excess of the mercury salt had crystallized out of the solution. Sufficient water was added to dissolve these crystals, and the prints were left immersed. They were left for a fortnight in this solution, and at the end of that time, although fainter, the reduction being uniform, there was no tendency in the image to disappear.

In our experiments with Mr. Hart's hypochlorite solution, there is one curious result to note, which will require to be repeated before we can draw any conclusion from it. We tried a portion of the concentrated solution sent out by Mr. Hart, without any dilution. In it we placed, first, a gold-toned collodio-chloride print on paper. After an immersion of half an hour, it was scarcely changed, and it remained an hour before it was reduced in any serious degree, and then the reduction was uniform, and without the mealiness we have mentioned. A slightly toned albumenized print was then immersed, and it quickly began to be reduced, with considerable mealiness. In ten minutes it had disappeared entirely, together with some mottled yellow patches of imperfect fixation, the effect on which we had been wishful to observe. On removing it from the solution, we found that all traces of albumen were also dissolved, doubtless by the caustic soda present, and we had nothing but a piece of plain paper bleached to a very pure white. We shall repeat this experiment; but we may remark here, that an incidental result of these experiments has been a confirmation of our before expressed conviction, that mealiness is a result of the varied action of free chlorine on the atoms of reduced and partially reduced chloride and albuminate of silver forming the image, and does not occur except where albumen is employed.

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[*] When chlorine water was employed, the oxygen was obtained by the decomposition of the water, the chlorine uniting with the hydrogen to form hydrochloric acid. That method is abandoned in favour of the more convenient method with hypochlorite of soda. In the decomposition of this agent, oxygen and chlorine are liberated; the decomposition of the water, with the further liberation of oxygen and formation of hydrochloric acid, may follow; but it is not under all circumstances a necessary consequence.

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ECHOES OF THE MONTH.

LETTER FROM THE OLD PHOTOGRAPHER.

Summit of Snowdon, June 21, 1866.

DEAR EDITOR,—An eccentric friend of mine has written a book in which, amongst other paroxysms, he describes the delicately pulsated wave of circumambient sonorificence with which

> "Echo, echoing echo, echoed echoes still."

I never could quite make up my mind whether he was girding at me or not with his multiplied echoes; but as he continues "with the diminutive toot of the trumpet," I rather think, as Dogberry would have thought, he *must* have had the reverberations of the "Old Photographer" in his ear when he wrote the line. However that may be, and seeing that I have escaped from town for my summer holiday, which will prevent me picking up my monthly gossip of doings amongst photographers, I shall not be able to fill the space you are kind enough to reserve for me in the usual manner. As a substitute, and for which I apologise, I will trouble you with this letter, written amongst the echoes of Snowdon—the real originals, not those for which you are wont to look to me. Photography on the summit of Snowdon would not, I fear, yield much profit or pleasure, and if my photographic experiences here be scanty, please to remember that I have left all my photographic impedimenta at the hotel at the foot of the mountain.

Impelled by that miserable weakness with which I am cursed—a disposition to oblige—I have allowed myself to be persuaded to accompany some friends through North Wales, and I am here, indulging in the luxuries of the Snowdon summit hotel—two or three huts, erected by some enterprising guides at the top of the mountain—with the intention of staying all night for the purpose of seeing the sun rise in the morning. I know this is all a miserable fallacy. There *is* a tradition, I believe, that the sun has been seen to rise unobscured by clouds from the top of the mountain, but I have not much faith in the story, having been here more than once before for the same purpose; but my companions are young and enthusiastic, and anticipate success.

My age and gravity are known. I therefore, as the beds are damp, thought I could not do better than endeavour to make some amends for running away from my duty, by devoting the midnight hours—I cannot say the night, for the "empire of the night" is unusually doubtful at this date—to writing to you.

Having told you where I am, perhaps you would like to know how I got here? I will tell you; but if any part of my narrative should fall beneath the dignity of history, please remember that the rarified air of the mountain elevates the spirits, and that my companions have not arrived at that period of life which is generally hoary, if not venerable.

We arrived at Caernarvon by rail—no matter from where—yesterday afternoon. Having performed an hour's perambulation over that picturesque town and its famous castle, we started in a car of the country for Llanberis, at the foot of Snowdon, where we knew from experience that we should be received as old friends at the Dolbadarn Arms, perhaps the jolliest hotel in the Principality. We got there in time to have a row on the lake, and to take a walk up the little hill at the back of the house, from which the top of Snowdon is visible. You, Mr. Editor, will remember the place, when we passed through Wales last year on our way to Ireland, with the patriotic intention that the NEWS should have an account of the Exhibition from personal observation, instead of a series of guesses compiled from the catalogue. We stayed at the Dolbadarn, and walked up this hill and saw Snowdon. You will also remember how difficult I found it to prevent you rushing up the mountain then and there, to ascertain if food for the camera could possibly be found there, and how I should have been defeated had you not, just as I was reluctantly assenting to go, found that you had an attack of sudden rheumatism in the knee.* We finished the evening, in the twilight, under the glorious old sycamore tree, chatting over old times with the genial old landlord, who remembered, with a shudder, the night, some years ago now, when a party, of which several were present, were lost in a storm on the mountain, and given up for lost at the hotel.

About noon next day we mounted our ponies (it is considered the correct thing by raw tourists to walk) and commenced the ascent; or, as the poet of our company remarked—

> "We, putting a load on
> The beasts that we rode on,
> Began to do Snowdon."

The day was lovely. The sun shone with forty blister power. The first part of the journey consists of a gentle ascent only, strewed over with the *debris* of the rocks, and of bogs which, at this time of year, are nearly dry. After about two miles were passed, we began to find that we were ascending, and the temperature was falling. Great mountains appeared to rise on either side of us. On the whip-hand (let us be equestrian now we are on ponies) was the famous perpendicular rock, the Clogwyn Du Yr Arddudwy, over which the Rev. Mr. Starr fell some years ago. On the left (is that the bridle hand?) rose the picturesque mountains of the Snowdon range, bordering the wild and gloomy Llanberis pass. Looking back, we had a wonderful view of Llanberis and its lakes in the foreground, then the towers of Caernarvon Castle, backed by the Menai Straits and Anglesey. Beyond St. George's Channel, and in the extreme distance, we thought, so clear was the atmosphere, we could distinguish the coast of Ireland, but this was scarcely possible. Climbing upwards for another hour, the ponies behaving more like human creatures than beasts, except that they exhibited more patience, we came to the Saddleback, a narrow stretch of land with yawning precipices on either side. Securing our horses at the bottom of the last ascent, we reached the top in two hours from our start.

When members rise in their place to make a statement not exactly to the purpose, they conclude with a motion to put themselves in order. Fearing that many will say, "What has all this got to do with photography?" I feel the necessity of doing something of the kind myself, but instead of moving the adjournment of the house, it will put me sufficiently in order if I say that, even in the out-of-the-way place we have now arrived at, we found, as we find in every little shop and hotel in Wales, photographs for sale.

Llanberis, June 22.

> "The King of France, with forty thousand men,
> Went up the hill, and then came down again."

And so did we, to about as much purpose, for the sun, as usual, refused to be visible, as perhaps a decent sun should, at his rising. The chief interest to photographers in this veracious history is the suggestion to those who make their summer photographic ramble in Wales, that whilst the ascent of Snowdon will well repay the toil, for its own sake, it will probably be a disappointment if undertaken with the purpose of seeing the sun rise.

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* The "Old Photographer" is romancing here.—ED.

I am painfully conscious of having promised a fine photographic summer in the "Echoes" a few months back. What an unfortunate and unreliable prophet I am may be guessed when I tell you that I sat down, besieging a view, from the first to the nineteenth of June, for the purpose of doing justice to it, and was not able to succeed. "The rain, it rained every day," and the wind was abominably rude. Such weather would have gratified King Lear, when he exclaimed:—

> "Blow, wind, and crack your cheeks! rage! blow!
> You cataracts, and hurricanoes spout," &c.

Sometimes a delusive bit of sunshine would peep forth, and away we went, only to be disappointed, and to congratulate ourselves on the tent cover being made of waterproof material. However, the weather has been much more like summer time since, and I hope it will continue.

Perhaps one of the greatest objections to the wet process is the practice of fixing the picture immediately after it is taken. This renders necessary the carrying a bottle of hypo with you—always an uncomfortable thing to pack with other chemicals, and one which keeps me in a constant state of nervousness, for fear it should contaminate any of the apparatus in its neighbourhood—and a large supply of water. Fixing in the field also induces you to economise water, and run the chance of your negative being troubled with efflorescence, or cracking, or some other of those diseases to which insufficiently washed negatives are liable. In my present campaign I have avoided this difficulty in the following manner:—After the picture has been developed and intensified, it is slightly washed, and a solution of equal parts of golden syrup and water poured over the plate. It is then placed in a plate-box with V grooves, and fixed at leisure. I have found plates to keep four-and-twenty hours in this state without deterioration, and I have tried it on those of a very large size.

One morning, as I was wondering when the rain would cease raining and the wind blowing, and that I should find some occupation for relieving the tedium of waiting for weather, Mr. Mudd's little book, containing the papers he has occasionally contributed to photographic literature, came by post, and saved me from becoming mad with monotony. I don't think it is possible for any one who takes any interest in our art, or who appreciates genial and harmless humour, or who has a taste for good, honest, manly writing, to help being refreshed, instructed, and amused by this delightful little production. That best of dry processes—the collodio-albumen—is described minutely, clearly, and without redundancy of words—a great relief to the reader—by the author, who has worked so hard to bring the process to perfection, and to produce the wonderful specimens of its powers, in his hands, he has occasionally exhibited. If we are to judge of processes by results, the best of tests, then certainly this method of preparing dry plates far surpasses all others, for the most enthusiastic advocates of other processes would scarcely dare to show their best productions in the same room with Mr. Mudd's.

HINTS FOR A PHOTOGRAPHIC RAMBLE.

BY A PRACTICAL MAN.

The twenty-sixth of the present month is fixed for the formal opening of the Moreton Hampstead and South-Devon Railway, when tourists and photographers will have an opportunity of visiting some of the loveliest and most romantic spots in England—perfect "clover nooks"—places that, from the irregularity of the country and great engineering difficulties in the way of railroad extension, have been, with much of the "beauty of Devon," as a sealed book, known only to and visited by a fortunate few; but the event recorded above will open up a most important district to photographic artists, offering a rare assemblage of "beauty and bits." The difficulty in getting at the same may be easily understood when it is found, on referring to the statements of surveyors and engineers, that there are yet more than 1,200 square miles, in the county of Devon, the "Garden of England," unapproached by any railway. Think of this, my masters, and of the food yet in store for the camera! However, for the present, the best advice I can give those interested in the matter is, for them to pay a visit for a few days to Bovey Tracey, which can be made a resting point, and from which place visits can be made to the Haytor Rocks and celebrated Becky Fall, a fine cascade, dashing over a series of rocky projections, to the depth of some eighty or ninety feet, and presenting a most interesting scene, peculiarly romantic and beautiful; then Lustleigh Mill, nestling in its orchard and garden, with the quiet rustling of the little stream flowing down its course amid shingle, rock, and boulder—the only sound that has hitherto for ages disturbed the quiet of this lovely spot—now broken in upon by the rolling of the train and puffing of the "iron horse." The church and village are excellent subjects, and contrast admirably, by their picturesque appearance, with the scenery of the surrounding hills. Near this is the far-famed Lustleigh Cleave, the idol alike of poets and painters, and a great object of interest to all. Poets have described this as the "Rough romantic valley, rude and untouched from the beginning of time." The great picturesque points to be found are those known to natives, and pointed out to strangers, as the Raven's Tower, the Foxes' Yard, Horsham Steps, and the Nutcrackers. Near these is Bishopstone Bridge, which takes its name from a large flat piece of granite, square at the foot, but the upper surface presenting a face bearing the representation of a shield, rudely carved with a coat of arms. To enumerate all the objects of interest in, round, and about, would take more space than can be spared; so we would counsel all wet and dry plate operators, who wish to get hold of something new, to take a trip to Exeter by rail, then on to Newton by the South-Devon line, and to Bovey by the branch about to be opened, and along which they will find a mine of pictorial wealth that has been but sparingly visited by the votaries of the camera.

COLLODION PRINTS ON PAPER.

BY DR. A. MOITESSIER.*

If we compare the most perfect positive obtained by the usual processes with the negative from which it was printed, we are always struck with the difference in sharpness existing between the two proofs; all the delicate detail and harmonious half-tones which we perceive in the negative, disappear more or less in the most successful positive proof. This inconvenience, unimportant when we are engaged in the representation of objects of large dimensions, is, it may be supposed, a serious obstacle in micrographic pictures. The cause is found in the nature of the paper which serves as a support to the chemical agents. The texture of paper is necessarily granulated, and its porosity especially always gives a rugged aspect to the finest lines of the picture, which thus lose a portion of their delicacy. The coating of albumen applied to the paper partly remedies this defect, it is true, but the evil still exists, whatever the method employed.

Collodion, on the contrary, by its essentially homogeneous texture, and its extreme thinness of film, does not partake of this inconvenience, and that is the principal cause of the great superiority of negatives. The finest details are clearly brought out, and the half-tones acquire a marvellous softness and transparency. To these advantages must also be added the extreme facility with which, by frequent washings, the chemical compounds that have become useless are removed, while the thickness and porosity of paper always renders this operation difficult and uncertain; hence the frequent fading of positives on paper, while there is scarcely an instance of the spontaneous decomposition of collodion negatives.

Advantages so important induced us to accept without any hesitation a method capable of combining in a positive proof the eminent qualities found in the negative. The question may be resolved in a manner not at all complicated, and the following method realizes many important conditions which are not found in any other process.

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* We translate this chapter from Dr. Moitessier's excellent work on Micro-Photography.

Transferring Collodion Proofs.—Instead of printing the positive picture by applying a surface sensitive to light direct to the negative, we employ the camera to reproduce from the negative, just as in copying an engraving. It is very evident that the result must be reversed, for as every model supplies a negative direct, the latter, when photographed, will give a positive picture. We can also obtain at pleasure a proof of any dimensions, from reductions infinitely small to enlargements, to which it may be said there is no limit.

Again, as it is perfectly indifferent which face of the negative is presented to the objective, we can, without difficulty, rectify the position of the picture, which, in negatives of microscopic objects, has been reversed by the action of the enlarging apparatus. This is frequently a very great advantage, which no other method possesses. It is sufficient, therefore, after focussing and taking the usual precautions, to place a collodioned plate in the apparatus, and develop it in the usual manner. To conclude the operation, we must afterwards substitute a less fragile support for the glass plate, one susceptible of giving a base to the proof, which shall bring out all the details. To this end the collodion film is transferred to a sheet of paper by special means, and we thus obtain a picture of remarkable perfection, as little fragile as an ordinary positive.

The apparatus employed for copying the negative differs in no respect from an ordinary camera; it is only necessary that its length be double the focal distance of the objective, if we wish to obtain proofs of dimensions equal to those of the negative; and it is also the most suitable arrangement to give to the instruments.

The preparation of the plates is that employed in the wet collodion process, which method must be strictly followed, without essential modifications. The collodion must always satisfy one important condition, which constitutes the principal element of success. Negative collodion has the inconvenience of being too thin, so that the film does not possess sufficient body to admit of its being readily transferred to paper; it must be rendered more viscid by increasing the quantity of pyroxyline. It is, however, difficult to indicate exactly the quantity of pyroxyline which must enter into its composition, for we often see equal proportions of this product yield collodions of very different degrees of viscidity; some preliminary trials are therefore indispensable, in order to arrive at the proper quantity. The quantity of pyroxyline sometimes amounts to two per cent., while at other times one per cent. is sufficient. In all cases the collodion should be as thick as possible, provided it retains the property of flowing easily. Sensitizing the film presents no difficulties, only it is advantageous to employ a slightly acid silver bath. About two per cent. of crystallizable acetic acid is added to the ordinary bath.

The time of exposure is extremely important, and cannot be indicated in a precise manner. The intensity of the light, the greater or lesser transparency of the negative, the focal length of the objective, the size of the diaphragms, &c., are so many causes which greatly influence the duration of the exposure. In all cases it is very short, rarely exceeding ten or fifteen seconds.

By varying the duration of the exposure, we can obtain, with the same negative, positive pictures greatly varying in character, which, in many cases, is of great utility. Thus, after a short exposure, we obtain a proof with strong contrasts, which result in hardness, if the time of exposure be reduced too much. On the contrary, by prolonging the time of exposure, the picture acquires much more softness, the contrasts disappear, and we at last completely destroy the harmony, and we obtain only grey proofs. We may thus, by an excess of exposure, advantageously modify the excessive hardness of a negative, so that by contrary means we are often enabled to make use of weak negatives which by the ordinary printing process would give but unacceptable results. The picture is developed by means of pyrogallic acid, as for negatives, with this single difference, that it is usually advantageous to use a weaker solution. The following proportions are found most suitable in the majority of cases:—

Pyrogallic acid	15 grains
Distilled water	1 pint
Acetic acid	45 grains.

Under the influence of the developer, the picture should make its appearance almost immediately, and become fully developed in a very few moments. If it be slow in appearing, this will be a sure sign of a defect in the exposure, and the final results will be hard and deficient in half tones. The development should not, however, be too sudden, for then the opposite effect will display itself; the proof will be grey and without contrast. The same defects will also appear, if, with a suitable exposure, the action of the pyrogallic acid be continued too long or too short a time. Although in this particular it would be difficult to give precise instructions, we may venture to say that the picture is generally sufficiently developed in one or two minutes.

The degree of strength of the above developing bath generally gives very good results; it may, however, be advantageously modified according to the conditions fulfilled by the negative. If, for example, we have to copy a negative with strong contrasts, very vigorous in the blacks, it is preferable to exaggerate a little the duration of the exposure, and develop with weaker pyrogallic acid; the proof thus obtained has much more softness, for the half tones have time to appear before the blacks have acquired too great intensity. If, on the contrary, we have a feeble negative, it is proper then to diminish the time of exposure, and increase the strength of the developer a little. We thus obtain an opposite effect to the preceding: that is to say, the blacks of the positive acquire intensity before the half tones are too much out; and, by stopping the action of the pyrogallic acid in time, we can vary at will the contrasts of the picture.

The operation of fixing demands no particular precaution: we have recourse, as usual, either to hyposulphite of soda or cyanide of potassium. The positive picture obtained by the means above described always possesses a disagreeable colour, which it is important to modify. By a process analogous to toning paper proofs, we easily arrive at the desired aim. The collodion film, freed by abundant washing from the last traces of the fixing agent, is covered with a solution of chloride of gold as neutral as possible. The best method of preparing this bath is by dissolving fifteen grains of chloride of gold in an ounce or ounce and half of water, and adding a drachm of whiting in powder. When effervescence has ceased, the liquid is filtered, and sufficient distilled water added to make up a quart of solution. This bath will keep any length of time without decomposition, but the quantity employed for toning the positive must not be used again, but thrown away.

Under the influence of the chloride of gold, the picture immediately acquires a blue-black colour, which in the course of a few minutes penetrates the entire substance of the collodion. We may ascertain that the action is terminated, when the picture, examined at the back, exhibits at no point its original grey colour. The time required for toning is very variable, according to the conditions of the proof; it is much longer when the proof has taken a long time to develop, and is formed of intense blacks. It is seldom, however, that the complete action of the gold bath requires more than three or four minutes; it often requires even less time. It is sometimes necessary to renew the toning solution once or twice; this happens especially when the picture possesses very opaque portions. The proof is finally washed in abundance of water, and it then only remains to transfer it to paper.

The transfer of the collodion film, which at first view appears a very delicate operation, is, on the contrary, of the greatest simplicity, and succeeds quite regularly if the collodion employed possesses the requisite toughness. The transfer may be made with the wet film, but this requires a certain amount of skill; therefore, it is better to have recourse to the following method, which succeeds in an almost infallible manner.

After the last washing, the plate is placed on a stand in a perfectly horizontal position, maintained so by screws. We then pour over it as much distilled water as will remain, then apply to the film a piece of ordinary albumenized paper previously moistened, taking care that no bubbles of air are retained between the paper and the collodion. We now raise up the plate, holding the paper by the two corners to prevent its sliding, and the whole is kept in a vertical position for a few moments, to allow the water to drain off. The plate is then left to itself until the paper is *completely* dry: it may be put in the sunshine, or brought near a fire, to hasten the drying. Finally, the plate is immersed in a bason full of water, and at the expiration of ten to fifteen minutes, the piece of paper detaches itself almost spontaneously, bringing with it the collodion film, which adheres to the paper in the most perfect manner. When dry, the proof is extremely brilliant, and the most delicate details appear, with all the sharpness they possess in the negative.

The preceding description shows that this method of printing presents no serious difficulty in its execution; all the essential operations are identical with those of the negative process, and an operator already initiated in photographic manipulations will, after a few experiments, find no real difficulties to contend with. Although applicable without exception to every case that presents itself, it is more especially so to the enlargement of small proofs, which necessarily require the employment of a peculiar objective, and a special fitting up. Lastly, when we have to produce only a small number of positives, this method recommends itself by the short time necessary for its execution, as a few minutes suffice to arrive at a final result. It is only to be regretted that it cannot yet enter, in a regular manner, into industrial photography. We cannot deny that the ordinary process of printing positive proofs possesses the advantage of being essentially more practical, and available by operators the least skilled in the delicate operations of photography.

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DE LA RUE AND CELESTIAL PHOTOGRAPHY.[*]

It is about twenty-seven years since we were told of a remarkable discovery, made by a Frenchman, of a process by which external objects were made to delineate themselves on prepared metal plates, placed in a camera obscura, with a perfection of detail and a delicacy of delineation which had never been approached by the human hand. The pictures so produced by Daguerre were seen and admired. The world of science, once awakened to the fact, that the sun's rays could be made to copy, on prepared tablets, the objects which they illuminated, went busily to work, investigating the curious phenomena involved in the art of photography. It must not be forgotten that Wedgwood, assisted by Davy, produced *unstable* photographic pictures in 1803.[†] Mr. H. Fox Talbot, soon after the announcement of Daguerre's discovery, produced his "Photogenic" drawings, speedily followed by his beautiful "calotype" pictures. Sir John Herschel investigated, with much industry and skill, the chemical changes produced upon organic and inorganic substances by solar agencies; and Mr. Robert Hunt published, in rapid succession, his discoveries of the developing power of the proto-sulphate of iron, of the influence of the chemical rays in accelerating the germination of seeds, his "chromatype," and other processes for producing photographic pictures. Beyond this, at the second meeting of the British Association at York, in 1844, this photographer showed that the chemical changes produced by the sun's rays were not due to their luminous power, but were the consequence of *dark* radiations, for which principle or power he proposed the name of Actinism—a term which has been generally adopted.

These researches appeared to confirm the results obtained, and the hypotheses propounded by M. Berard, in 1812, which were reported upon by Berthollet, Chaptal, and Biot.[*]

A few years passed away: Professor Schönbein discovered gun-cotton, and at the meeting of the British Association at Southampton, in 1846, he introduced it as an important improvement upon gunpowder. As a destructive agent, gun-cotton has been slow in making its way as an agent for projecting cannon-balls or for rending rocks; but dissolved in ether, it forms that collodion which Mr. Archer, in 1851, taught us how to use in multiplying images of the beautiful, and the process to which it has given its name is now universally adopted, to the almost entire exclusion of every other kind of photographic manipulation.

At a very early period (1838–40), it was seen that the changes produced on the salts of silver by the sun's rays might be used to render meteorological and other instruments self-registering. In 1838, Mr. T. B. Jordan, then secretary of the Royal Cornwall Polytechnic Society, devised and used photographic methods for registering barometers, thermometers, and magnetometers.[†] These methods, modified by Mr. Brooks and Mr. Ronalds, were subsequently introduced into the observatories at Kew and at Greenwich, where, at the latter especially, under the direction of Professor Airy, a beam of artificial light now registers through each day and night every movement of those steel bars which tell us of the variations in the earth's magnetic intensity, and of the occurrence of the strange phenomena known as "Magnetic Storms," now proved, by the investigations of General Sabine, to be intimately connected with those solar spots which are being explored—if the term is admissible—by Celestial Photography. While photography was making progress as an art, it was employed in a few hands as an aid in scientific investigations. Sir John Herschel especially used chemical compounds, sensitive to solar influences, to determine the relative values of the solar radiations proceeding from different parts of the sun's disc, and this led to the determination of the fact at the same time, by two distinct observers,[‡] that the chemical action produced by the rays coming from the edge of the sun were less active than those proceeding from its central regions. This fact has been, strangely enough, recently put forward as a discovery by Professor Roscoe,[§] without the mention of any previous observer, excepting Secchi, whose observations had reference to the calorific, and not to the chemical radiations. It is true that Professor Roscoe has made a series of excellent experimental observations, and that he has proved "that the intensity of the chemically active rays at the centre is from three to five times as great as that at the edge of the disc;" but in doing this he has only confirmed the results already published.[||] For example, in 1840, Sir John Herschel, in the *Philosophic Transactions*, Part I., p. 43, distinctly stated that he had detected "a real difference between the chemical agencies of those rays which issue from the central portion of the sun's disc, and those which, emanating from its borders, have undergone the absorptive action of a much greater depth of its atmosphere, and yet I confess myself somewhat at a loss what other cause to assign for it. It must suffice, however, to have thrown out the hint, remarking only that I have other, and, I am disposed to think, decisive evidence of the existence of an absorptive solar atmosphere extending beyond the luminous one. The breadth of the border, I should observe, is small, not exceeding 0·5, or one-seventh part of the sun's radius; and this, from the circumstance of the experiment, must necessarily err in excess."

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[*] From the *Quarterly Journal of Science*.

[†] *Journal of the Royal Institution*, vol. i.

[*] "To show clearly the great disproportion which exists in this respect between the energies of different rays, M. Berard concentrated, by means of a lens, all that part of the spectrum which extends *from the green to the extreme violet*, and he concentrated, by means of another lens, all that portion which extends from the *green to the extremity of the red*. This last pencil formed a point so brilliant that the eyes were scarcely able to endure it, yet the muriate of silver remained exposed more than two hours to this brilliant point of light without undergoing any sensible alteration. On the other hand, when exposed to the other pencil, which was much less bright and less hot, it was blackened in less than six minutes."—"Report of the Commissioners:" 'Annales de Chemie.' See also, "Report on the Chemical Action of Solar Radiations:" 'Transactions of British Association for 1850,' vol. lxxxv., p. 309.

[†] "On a New Method of Registering the Indications of Meteorological Instruments." By T. B. Jordan. 'Sixth Report of Royal Cornwall Polytechnic Society,' 1838.

[‡] *Philosophical Magazine*, vol xvi., 3rd series, contains an abstract of the memoir read before the Royal Society by Sir John Herschel; and also a paper in the same monthly part of this magazine, by Robert Hunt, on "Experiments and Observations on Light, which has permeated coloured Media, and on the Chemical Action of the Solar Spectrum," in both of which this fact was, for the first time, stated.

[§] "On the Measurement of the Chemical Brightness of various Portions of the Sun's Disc." By Henry Enfield Roscoe, B.A., F.R.S. Received June 12, 1863.

[||] See "On the Present State of our Knowledge of the Chemical Action of the Solar Radiations." A report to the British Association, in 1850, by Robert Hunt.

Mr. Robert Hunt, in the *Philosophical Magazine* already quoted, noticed the same phenomenon, and gave the same, as being the most familiar explanation of it; and subsequently, M. Arago, in his "Memoirs on Photometry," again drew attention to this important fact.

The results which have been obtained since 1840 appear to show, not merely that the chemical radiations generated near the edge of the solar disc are absorbed in passing through a greater depth of the sun's atmosphere, but that there is an actual *interference* (using this term in its ordinary acceptation rather than its scientific sense), exerted by the luminous radiations, and that the chemical radiations have their origin in a lower zone, that which produces Light-energy. The protected band which is seen to surround the prismatic image of the sun is not due to a lowering merely of chemical (actinic) intensity, as would be the case if it were an instance of loss by the absorption in the solar atmosphere; but there is evidence of a changed condition, such as is shown by the protected bands observed under the yellow and the red rays, where luminous and calorific power attain their maximum influence. On this point we have yet a few more words to say.

Professor Bond, of Cambridge, with Messrs. Whipple and Black, of Boston, in the United States, were the first to make a photographic picture of any celestial body. This was an image of the moon, obtained upon a Daguerreotype plate, which had been placed in the focus of the refracting telescope of the Harvard Conservatory. In 1851, some of these Daguerreotypes of our satellite were in the American department of the Great Exhibition. In 1852, Mr. Warren De la Rue obtained positive lunar photographs, in from ten to thirty seconds, on a collodion film, by means of an equatorially-mounted reflecting telescope of thirteen-inch aperture and ten-feet focal length. At this time Mr. De la Rue had not applied any mechanical driving motion to his telescope. He was, therefore, constrained to contrive some other means of following the moon's apparent motion. This he accomplished by hand in the first instance, by keeping a lunar crater always on the wire of the finder, by means of the ordinary hand-gear of the telescope, but subsequently by means of a sliding frame fixed on the eye-piece holder, the motion of the slide being adjustable to suit the apparent motion of the moon. As the pictorial image of the moon could be seen through the collodion film, and could be rendered immovable in relation to the collodion plate, by causing one of the craters to remain always in apparent contact with a broad wire, placed in the focus of a compound microscope affixed to the back of a little camera-box which held the plate, this was effective.

Excellent results were obtained under the disadvantages of the want of an automatic driving motion, which proved how perfectly the hand may be made to obey the eye. Mr. Warren De la Rue was admirably aided in his earliest experiments by Mr. Thornthwaite, since it was found impossible to work without the assistance of an experienced coadjutor.

In 1853, Professor John Phillips communicated to the Hull meeting of the British Association the results of his experience in Lunar Photography, and he then exhibited some excellent pictures of our satellite. Mr. Hartnup, of Liverpool, aided by Mr. Crooke and other photographers, took some good pictures of the moon in 1854. Father Secchi, at Rome, Mr. Fry, in Mr. Howell's observatory at Brighton, and Mr. Huggins, now so well known by his application of spectrum analysis to the stars, nebulæ, and comets, also produced lunar pictures. A great extension of Celestial Photography was promised in 1857 by Professor Bond, who applied the process in measuring the distance and angle of position of double stars, and also in determining their magnitude. He succeeded in obtaining pictures of fixed stars down to the 6-7th magnitude, and everything gave promise of a fruitful future, when death put a stop to his labours.

In the same year (1857) Mr. Warren De la Rue was successful in applying a driving motion to his telescope, which answered every purpose desired; and since that time he has unremittingly followed up the subject of Celestial Photography whenever his occupations and the state of the atmosphere permitted it.

The Academy of Sciences of Paris has lately recognized Mr. De la Rue's labours, by the high distinction of the Lalande prize of Astronomy. From the address which was delivered on the occasion of its presentation, many of the following notices have been derived. As the facts thus detailed have all been subjected to the most searching examination, they stand beyond suspicion, and furnish the most reliable record which it is possible to give of the progress which has been made in an inquiry involving the use of the most perfect astronomical instruments, the most delicate physical appliances, and the most sensitive chemical preparations, directed by a zealous and thoughtful mind. It has been by means of an equatorial reflecting telescope of thirteen inches aperture, designed by himself and constructed in his own workshop, that Mr. Warren De la Rue has attained that degree of perfection in Astronomical Photography which has earned for him the gold medal of the Astronomical Society and the Royal medal of the Royal Society.

His splendid photographic delineations of our satellite, with which the scientific world is familiar, owe their excellence, first, to the perfection to which the optical part of the telescope was brought by machinery of his own contrivance; and, secondly, to the remarkable performance of his clockwork-driving apparatus, which not only works smoothly and equably, but is capable of rapid and easy adjustment to the ever-varying velocity of the moon. Mr. De la Rue's chemical training has, moreover, enabled him to secure that nice balance of affinities in his photographic preparations, which has materially reduced the time required to impress the image on the sensitive tablet, and consequently to diminish the bad effects of disturbance of the image, resulting from the unsteadiness of our atmosphere. By these means, pictures of the moon have been repeatedly taken by him in the focus of his reflecting telescope, so perfect as to bear considerable amplification—for example, to thirty-eight inches in diameter. These images admit of measurement with the microscope, so exact as to furnish excellent data for investigations in relation to a supposed physical libration of the moon. These pictures are also now being used as the foundation of the large map of the moon, six feet in diameter, which is being laid down by the Moon Committee of the British Association, as the basis of the intended zone observations of the lunar surface, by the co-operative action of certain English astronomers. The beautiful stereoscopic views of the moon, with which all are familiar, have done much, and are capable of doing more, in throwing light on the configuration of the lunar surface. It is especially the stereoscopic combinations of enlarged pictures which are calculated to impart a correct knowledge of the relative height and depressions of the terraces, undulations, dykes, and furrows of our satellite.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 4th July, 1866.

At the June meeting of our Photographic Society, Mr. Johnson submitted to the inspection of the members some modifications which he has recently introduced in the construction of his panoramic apparatus, the results of which are:—

1st. The possibility of operating with objectives of different foci. The old apparatus were constructed specially for the focus of one objective; thus they were fixed. In the new system they are movable, and the distance may be regulated at pleasure, which admits of operating with different objectives by means of a simple change of frames.

2nd. The possibility of accelerating or slackening the movement of the apparatus during the operation, according to the intensity of the light.

3rd. The possibility of maintaining the frame in perfect equilibrium, during the longest operation, by means of a counterpoise moving in an opposite direction.

4th. The application to stereoscopic proofs by means of two coupled apparatus moved by clockwork.

Other modifications of detail in construction have been devised by Mr. Johnson, which permit of reducing the apparatus to the smallest bulk for packing and conveyance.

M. Laussedat made the following communication upon the application of Mr. Johnson's apparatus to the registering of panoramic views:—

"The ingenious panoramic apparatus of Mr. Johnson has suggested to me the idea of a continuous register on paper, the realization of which, although presenting some practical difficulties, yet seems to me not impossible. In its present state, Mr. Johnson's apparatus can only be applied to the production of proofs on wet collodion, on account of the smallness of the aperture in the opening through which the picture passes; but some experiments have been made in considerably enlarging this aperture, and to obtain panoramic views of great size in a very short time, even upon dry collodion. Without desiring to enter into any details on this subject, and before undertaking myself the experiments to which I cannot devote much time, I have come here to consult the most competent and intelligent persons on the subject.

"I propose to apply to a camera the ordinary arrangement of registering instruments, and, for greater simplicity, I employ nearly the whole clear field of the objective. A strip of negative paper, rolled upon a feeding-cylinder placed upon one of the sides of the bottom of the apparatus, is stretched from this cylinder to another, which is the receiver, and occupies the other side. The length of the stretched portion between these two cylinders corresponds exactly with the amplitude of the field, which, to establish a data, I suppose to be thirty degrees.

"The camera being placed in position, as usual, and the objective uncovered during the time necessary to determine the action of the light upon the paper, we cover the objective with the cap, and turn the apparatus exactly thirty degrees. This rotary movement, performed by the hand, is communicated to the axis of the receiving cylinder, upon which the impressed portion of the band of paper is rolled, while the feeding-cylinder unrols a similar length of paper, which is presented to the field of the objective. We then remove the cap from the objective, and the operation is continued in the same manner upon the whole extent of the horizon which can be embraced from one point of view.

"When we have finished at the first station, the apparatus is conveyed to the next, and we thus obtain a series of panoramic views juxtaposed on the same strip of paper, until the stock is exhausted. The advantages resulting from such a mode of operating are too evident for it to be necessary to enumerate them, and I shall not be surprised if they have already occurred to other minds, particularly among those who are occupied with photography applied to geographical and topographical researches.

"The principal difficulty arises evidently from the slowness of the action of the light upon the negative paper, and other difficulties may present themselves in the rolling the paper upon itself."

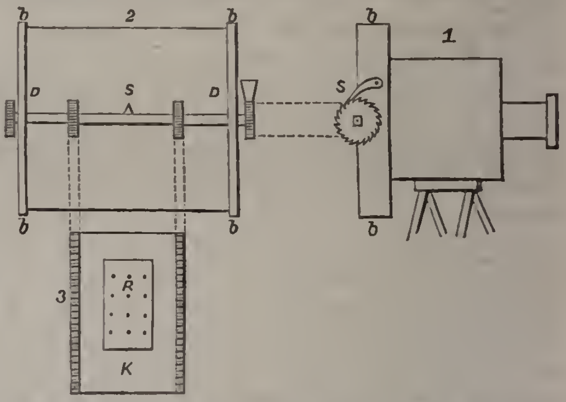
M. Civiale enquired of M. Laussedat, if he would be satisfied with a process in which paper prepared in the morning would not keep beyond the same day. "In the affirmative case," said M. Civiale, "I can certify that it is now easy to reduce the time of exposure usually necessary for waxed paper, at least three-fourths. The process, in other respects very simple, consists in floating the paper on the silver bath at the moment of development, and before submitting it to the action of gallic acid. An exposure of sixteen minutes is thus reduced to four." M. Civiale added, that the preparation of waxed paper is far from being so tedious as is generally supposed; thus, he calculates that to cut, wax, and sensitize two hundred sheets of paper 12 by 16, does not require more than forty-six hours.

PHOTOGRAPHY IN GERMANY.

Berlin, June 25th, 1866.

In No. 27 of the *Mittheilungen*, page 53, you will have seen the diagram of a very simple and interesting apparatus for making medallion portrait cartes. I am now able to inform you that the apparatus works excellently, and send you herewith a proof, which represents sixteen pictures on the space of one card. Here is the description of the apparatus:—

b b is the back of the camera; fig. 3, the dark slide, with two racks on both sides, which correspond with two movable pinions on the turning part, D D (fig. 2). On the back of the dark slide is a pattern with marks (as many as you will have pictures on a plate). These marks correspond with the top, S, on the turning part, D D (fig. 2). The size of the picture required is regulated by an oval disc being fixed in the holder near to the sensitive plate. The dark slide is pushed in the back, *b b*, and the part D D turned, till the top, S, is coinciding with a mark on the pattern, R; then follows the exposure.



The chromo-gelatine relief, which plays so important a part in the process of Mr. Woodbury, has been lately applied here to the production of the so-called lithophanica. Mr. Megdenbane shapes this in porcelain, and then burns it, by which means a complete transparency is obtained.* I cannot but express, on this occasion, my astonishment at the latest proofs of Mr. Woodsbury's relief printing which you have so kindly sent me. They are the most effective which I have seen, and one surpasses in deepness and brilliancy of colour even an ordinary photograph.

A new photographic paper has lately appeared in the market, manufactured by Mr. Beyrich, and called Glutin paper. It is rough, like amorphous albumen paper, and produces quite as brilliant pictures. One can write and draw upon it with greater facility. The paper, when silvered, keeps longer white than ordinary albumenized paper, and contains no sulphur, which, as regards its durability, appears to me of great importance. The treatment is exactly the same as that of albumenized paper, yet it has the very essential advantage that it can be supplied in much more even proportions, and consequently will not give occasion for such frequent complaints.

I read with interest your communication respecting the new portrait triplet lens, and also the new patent periscope of Dallmeyer, and am anxious to become ocularly acquainted with the powers of these instruments. The Commission which was appointed by the Photographic Society for the examination of the periscope and pantoscope has now completed its work. It has decided in favour of the pantoscope, simply because it possesses a still larger angle of view than the periscope, and is more free from aberration.

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* Mr. Woodbury patented in this country the method of producing porcelain transparencies; but his attention has been absorbed by the printing process.—Ed.

You will have seen the photo-lithograph which gives an illustration of the effect of the pantoscope (No. 3). Indeed, both instruments have still the drawback of exhibiting the light spots on the centre of the plate. I see, in the last number of the *Photographic Journal*, that Dallmeyer has succeeded, by means of his new wide-angle lens, in preventing these, and has done so without distortion. This will be an extraordinary improvement.

Dr. Reissig's new researches on the sensibility of iodide of silver you have already printed. I regard the question, whether iodide of silver suffers really a chemical decomposition in the presence of substances that absorb iodine, to have been decided by these investigations; and this is so far of importance as it serves to establish the correctness of my views, so variously opposed, concerning the effect of the sensitizer.

I willingly concur with Mr. Lea and his adherents concerning the photographic sensibility of pure iodide of silver, which, without suffering a chemical decomposition, yet produces a developable picture. It is, however, otherwise in the presence of bodies which absorb iodine: here the iodide of silver undergoes a chemical decomposition, and that this is in no way unessential is proved by the remarkably superior sensibility to light evinced by the sensitizer.

A very interesting explanation of the origin of the sulphuric acid in the silver baths has lately been here given. There are in the trade several kinds of filter paper, which contain salts of sulphuric acid in great quantities. Mr. Kruger, who had first perceived the uncleanliness of the silver baths by sulphuric acid, sent me, a short time since, the eighth part of a sheet of his filter-paper, which reacted so strongly on sulphuric acid, that pure water which had been once filtered through it with nitrate of barium gave a very noticeable precipitate: this vestige of sulphuric acid is evidently a residuum of the bleaching process. To remove the last trace of chlorine, the paper must of course be treated with hyposulphite of soda, which is thus changed into sulphate of soda.

At the last meeting of the Photographic Society a long discussion took place concerning the splitting of the negative collodion film, in which many interesting facts were mentioned. It was thought, formerly, that this splitting would only take place on plate-glass. Mr. Hichen established, however, that even common plates of glass exhibited this fault, and that dampness especially gave rise to it. He covered a half of a varnished negative with damp blotting-paper, and let it rest several hours; in this damp part were found splits, whereas the other part remained undamaged. It is remarkable that these clefts are in no way to be removed, whilst clefts on mirror-glass disappear by the action of alcohol, ether, and even by simply heating the plates. At the same meeting the spontaneous drying of wet plates with long exposure was discussed. This circumstance is, of course, of great importance in taking interiors, where exposures of half an hour are no rarity. There are cases in which plates undergo remarkably long exposure without any preliminary precautions. Thus I know that my friend Mr. Nickel, a very clever photographer here, spent, in the reproduction of an oil picture, one hour and a half on the exposure alone. Many others, however, complain of dry spots in exposures of only a few minutes. As remedies, the use of a collodion without cadmium salts, and the placing of wet cloths in the camera, have been recommended. Both are only partly successful. Of late I have had to contend much against dry spots when using not quite fresh silver baths with ten per cent. of nitrate of silver; these, however, disappeared when I diluted the bath to the proportion of 10 : 12. I have also made attempts with other old baths which gave dry spots, and found that these evils can be removed by dilution. It is remarkable that quite freshly-prepared baths often give dry spots. Indeed, in connection with these long exposures, another drawback appears; that is, the infiltration of the silver solution into the wood of the dark slide. It is singular how strongly, after being used some short time, the wood of the dark slide becomes impregnated with silver solution. I steeped, as a trial, the dark slide of a stereoscopic camera, which had been used for eight weeks, in hot water, and thus obtained a pint of coffee-brown liquid, which reacts very considerably on silver. After long exposures, these substances contained in the wood are absorbed into the spongy collodion film, and occasion, by the development, the moss-shaped designs which spoil many beautiful plates. In order to obviate this inconvenience, I have, after a thorough cleansing of my dark slides, dipped them by the corners into melted paraffine. Paraffine is known to be one of the organic bodies least susceptible to chemical influence, and its use here is on that account of great advantage. These dark slides then remained in an excellent condition, and have since then been so preserved.

THE "REASON WHY."—SUNLIGHT PRINTING.

Sir,—I have a few remarks to make upon Mr. Bovey's letter in the News of the 22nd, and as I feel that the correspondence, which has been carried on for so many weeks, cannot be of any great interest to the majority of your readers, I must ask, with this letter, to close the controversy.

In the first place, I would remark, that I did not lay "great stress" on any "remarks" "offered by Sir John Herschel." I rather implied that the results of his *experiments* were not a little in favour of sun-printing. I should have thought that when Sir John Herschel was making his important researches into the action of various fixing agents, he was engaged in rather a large instead of a "*small field*" of experimental labour.

I do not see what any especial person's negatives have got to do with the theory of sunlight printing. I set forth—as I have had occasion before to remark—certain theoretical considerations, from which it would appear that, in order to obtain on a positive proof gradations the most nearly approaching those of the original negative, sunlight printing was the best.

A photographer of high repute produces a class of negatives which, in Mr. Bovey's hands, print best in the shade. How, I ask, does this fact disprove the superiority of sun-printing to shade-printing, that negative being used in each case which is best adapted for the particular class of printing for which it is used?

I quite agree with Mr. Bovey, that "diffused light should be the test for perfection." One would never think of taking a picture out into the sunshine to look at it, though I fail to find in this fact any argument in favour of "diffused light printing." Indeed, to carry out Mr. Bovey's remarks upon this subject would tell against him, as on his own showing, a negative taken in direct sunshine should yield the best results when printed in sunshine.—Yours truly,

Nelson K. Cherrill.

MAGNETIC CONDITIONS OF PHOTOGRAPHIC ACTION.

Sir,—In my last paper, the cause of the precipitation of silver upon the latent image was described as due to a local magnetic action established by the actinic rays. As the beauty of the photograph greatly depends upon this action being strictly confined to those parts of the film where they have passed, it becomes a question of considerable importance to the photographer whether, in the preparation of his sensitive surface, there is danger of inducing a magnetic action without the influence of light.

It is a well-known fact, that friction will readily communicate the magnetic power to hardened steel. A worn file is seldom free from possessing this property, and as the attractive power of the latent image is of a similar kind, it may be expected that friction will establish a magnetic action upon the surface of a glass plate; as in the process of cleaning, it is almost impossible to avoid employing mechanical friction, and therefore exciting electro-magnetic action. It is somewhat essential the operator should understand whether and under what conditions this action is likely to be of a sufficiently permanent character to interfere prejudicially with the formation of the image. The importance of obtaining a chemically clean surface before collodionizing is well known, and some operators are possessed with the idea that immediately before pouring on the collodion, the plate cannot be polished too much. If its surface is perfectly clean, and the cloth contains no gritty or hard particles, not much injury follows this practice, for although the surface may become charged with electricity, representing the isolation of a part of the combination of forces known as cohesive, yet, as no magnetic action of any degree of permanence can readily be established upon the surface of chemically clean glass, the chief objection to this final polishing is the plate attracting particles of atmospheric dust, and thus causing spots; but if the glass is not chemically clean, but contains upon its surface films of organic matter, why then the longer it is rubbed, and the warmer the temperature, the worse it will be, as induced by heat and friction a magnetic action is established of a more or less permanent and powerful character, dependant upon the nature of the organic impurities present on the surface of the glass plate.

A properly prepared sensitive film consists of a selection of compounds, in which the opposite forces of cohesion and separation are exactly in equilibrium when isolated from light at common temperatures. The degree of sensitiveness to the disturbing influence of light the film possesses depends, therefore, upon their exact adjustment. In perfect accordance with this state of unstable equilibrium is the danger resulting from the interference of heat. This effect represents the active antagonistic action of the two forces of separation and cohesion on matter. When, therefore, a substance so sensitive as the collodion film is subjected to the influence of an atmosphere liable to constant fluctuations of temperature, the amount of heat it is capable of sustaining without the deteriorating effects becoming apparent by a general fogging or precipitation of silver from the developer over its surface, caused by the setting up of an electro-magnetic action, ought to be well known to the operator, as otherwise, without this knowledge, the employment of an unsuitable collodion in a warm climate can only be attended with disappointment and loss.

As heat betrays the solar force in action, and as among the rays composing this force there are some capable of destroying or greatly modifying the action of the more highly refrangible, which are almost solely concerned in the production of the latent image, there will be found great difficulty, with almost any modification of sensitive surface, in preventing their injurious action. It would seem, by the result of the few experiments which have been made in this direction, that bromine is an unsuitable agent to be employed in a hot atmosphere, and it would be a great boon to those photographers who are necessitated to work in tropical climates if some experimentalist could furnish a substitute for this element, which, whilst conferring equal sensibility, is capable of withstanding the action of the yellow rays; or, failing that, suggesting some mode of its employment in these extremes of atmospheric heat.

There is not much need of cautioning the photographer against employing even the smallest friction to the surface of the sensitive film. In the wet process there is no necessity to subject it to any before exposure, and the developer can be applied with very little. When, however, the temperature averages between 70° and 80°, as at this season, re-development is attended with friction sufficient to cause fog. When this result is found to accompany the strengthening of a weak image, a much clearer picture can be obtained by the use of one of the various organic developers. The friction to the film, absolutely necessary in the preparation of dry plates, is a serious evil in warm weather. The use of baths, instead of pouring from a jug, and a few days' isolation from heat and light before use, are very necessary precautions to adopt under these conditions.—I am, Sir, respectfully yours, Thomas Ayers.

Yarmouth, June 28th, 1866.

POSTPONEMENT OF THE EXHIBITION AT GHENT.

Sir,—I have received a letter, a translation of which is enclosed, from the Secretary of the Belgian Society of Fine Arts, announcing the postponement of the intended Exhibition at Ghent, in consequence of the events now in progress on the Continent. Will you kindly give it insertion in your columns, for the information of intending exhibitors?—I am, sir, your obedient servant, J. H. Dallmeyer.

19, *Bloomsbury Street, London, June* 29, 1866.

Ghent, June 27, 1866.

Sir,—The grave events which are now agitating Europe, and the determination of the railway authorities no longer to guarantee articles intended for exhibitions, have induced the Society of Fine Arts to postpone the exhibition. We take the opportunity of thanking you for the efforts you have made on behalf of our project, and beg you to continue your good offices until another period shall be fixed upon. Receive, sir, the expression of our distinguished consideration, &c., &c.—For the Directing Committee, (Signed)

F. Vanderhaeghen, Secretary.

To Mr. Dallmeyer, &c., &c.

[Since the above was in type, we have been favoured with a similar intimation from Mr. T. Ross. It is not necessary, however, to print both.—Ed.]

F. W. HART'S PROCESS FOR THE ELIMINATION OF HYPOSULPHITES: BEING A SUPPLEMENT TO HIS PAPER.

Sir,—Nothing is so conducive to failure in any experiment as a foregone conclusion that it will not succeed. The experimentalist who believes that a certain result will follow his operations often—possibly unconsciously—courts that result by his preconvictions. The editor of a contemporary journal having announced his conviction that my method of oxidizing hyposulphites would not answer, proceeded to try a method which he calls mine, and meets with the anticipated failure.

Publicity having been given in another journal to certain comparative experiments between my process—or rather, not my process, but one assumed as such—and peroxide of hydrogen, it becomes desirable that the photographic public should know the properties of that compound, which have not yet been stated in connection with this subject. I quote from one of our standard text-books:—

"Peroxide of hydrogen is a colourless liquid of 1·45 specific gravity. In its undiluted state it contains between 400 and 500 times its volume of oxygen. At temperatures above 60° it begins to be decomposed; if heated, the decomposition is rapid, and sometimes it takes place with explosion. It mixes with water in all proportions, and when thus diluted it is not decomposed until it is *heated to above* 100°. *It bleaches the skin, and completely destroys vegetable* colours, from being a powerful oxidizer. For preservation, it is necessary to have it acidulated with hydrochloric acid, and must always be kept in a cool place. This compound is resolved into water and oxygen, not only by heat, but by contact with certain metals—platinum, *gold*, and *silver*."

I will now ask the intelligent reader, is not the simile in my paper at the South London Meeting as to the use of prussic acid equally applicable to either this preparation or mine, seeing that they are both powerful oxidizers?

It is much against my wish to draw comparisons, *but*, as the writer in question has done it *ex parte*, I must, in self-defence, briefly state the case.

In the first place, a solution of peroxide of hydrogen, as seen above, contains hydrochloric acid, and is therefore ACID. My preparations are alkaline, therefore no free acid at any stage can exist.

It has been said that the image is lost in my process. Surely the journal in question was represented in person at the South London Meeting (and I beg the reader to refer to the report). If the image on any one of the several photographs treated had been lost, there were plenty of members present to have seen it; and, moreover, by my side was an able chemist, Mr. Sebastian Davis, who would have detected the slightest imperfection. The pictures were seen previous to the process, and there was no over-printing.

As to the test, which is said to be fallacious, for estimating quantities, I should not have thought of giving photographers the trouble of making quantitative examinations for the amounts of hyposulphites or hypochlorous compounds present; for had they the means at command of doing so, it would take several hours. The test-paper which is delicate enough to detect ozone in the atmosphere is surely to be relied on when its action is based on the same reaction. It will be seen from my instructions that they are only required in exceptional cases. Neither did I think it advisable to detail its mode of preparation, for if carelessly prepared by the inexperienced, they might, no doubt, fall into an error, as they would if they made their nitrate of silver or hyposulphite of soda. The test is, therefore, only recommended as a qualitative one. To show the simplicity of the matter, I will give a copy of the instructions for use;—

This preparation being prepared personally by the discoverer with the greatest care, he cautions photographers against the use of any not bearing his trade mark, as above, and the cork sealed with his name.

Directions for Use.

The prints having received (after fixing in hyposulphite of soda), an usual amount of washing in the ordinary manner, put into a dish one pint of water (to each sheet of paper), and one drachm of the eliminating preparation, mix well, and immerse the prints singly, as quickly as possible, keep them moving as is usual when fixing, let them remain in ten to fifteen minutes, give them a few changes of water, and pass into a bath containing a few drops of liquid ammonia to the pint of water, or rather, as the strength of ammonia varies considerably, make the water smell perceptibly of it; three or four minutes in this, then a rinse or two of water, and place to dry.

Remarks.

If, as occasion may require, prints to to be sent out in great haste, wash, after fixing, from thirty to sixty minutes, and instead of a pint of solution to the sheet of paper, use two pints, and so on—the less they are washed the more solution they require. In such cases it is necessary to have a book of F. W. Hart's test-paper, to ascertain if the hyposulphites are entirely eliminated. Full instructions for use accompany each book.

It was definitely stated that a preparation of hypochlorite of soda was at present used, therefore free chlorine does not now enter into the question; and if it did, it does not decompose water as suggested, except in the light, and then it would form hydrochloric acid, which is likewise present in the solution of peroxide of hydrogen; whereas, in my preparations, the much less harmless compound, common salt, is formed. I have now had a picture exposed (tacked to a board) night and day, sunshine and shower, for the past ten days; this was treated with a very concentrated solution of our preparation, and still the image is not gone. To be sure, it is well speckled with soot, as all our outdoor things are in London. I really think that had an engraving been placed by its side, through the heat and storms we have had, it would have presented a more sorry appearance. It is said a picture has been left in peroxide of hydrogen of ten volumes for twelve hours without perceptible loss of half-tone. I have pictures with half-tone in prefection, which have been unnecessarily left in our preparation for twenty-eight hours.

It is a question if peroxide of hydrogen remains as such in an open dish for a *few minutes*, as, on good authority, silver is the one metal which most readily causes its decomposition, especially in a finely divided state, as supposed to exist in photographs.—Yours respectfully, F. W. Hart.

Photographic Notes and Queries.

Samples of Albumenized Paper.

Sir,—Please to oblige the fraternity by complaining of the way samples of albumenized paper are sent out.

Being desirous of laying in a small stock of paper for the summer campaign, I sent to about half a dozen dealers, or perhaps they may be preparers of albumenized paper, requesting them to send me a few sheets as sample. This every one of them did, and all the samples were very good indeed; of course there were degrees of excellence. But what I have to complain of is, every one of them sent the sample on a small roller, only about half an inch in diameter. It is almost impossible to lay it on the sensitizing solution in this state, from its tendency to curl up; and coiling it the contrary way on the roller for a time does not remedy the matter, it cracks the albumen. Why not send it on a roller an inch in diameter at least, and finger mark it less also? As others are interested in this matter as well as me, I beg to call your attention to the subject.—Your obedient servant, J. Teasdale.

Simple Dry Processes.

Sir,—Mr. England, it seems, has not used any other substance but resins to prepare his simply washed and dried plates. His able hands, I should like to have heard, had tried an organic nitrate in the bath for the same purpose, developing the plates with the iron solution, precisely the same way. This method does not injure the bath to the extent that resin in the collodion does, and still supplies the organic element during the formation of the sensitive film in the bath, enabling the negative to be developed to completion, a very different result to when a pure nitrate bath is used in the same way for the same purpose. Of course the alkaloid, nitrate of morphine, or other organic nitrate, may be put in the collodion instead of the bath, but it seems preferable to put a definite quantity into the bath when prepared (a quarter grain per ounce is quite enough); and although the vessel in which it is kept will have a slight mirror of silver deposited, it will be found the solution does not any the more fog on that account.

People seem to expect a dry process as certain as the wet. I maintain that there are plenty of them in practice now, and if they would but take into consideration the number of wet plates exposed which are marred in one way and another, I think the conclusion arrived at would be that, plate for plate, one is as certain as the other.—I am, dear sir, yours respectfully, Wm. Bartholomew.

Egham, July 1st, 1866.

Talk in the Studio.

Photo-Relief Printing.—Every fresh specimen we receive of Mr. Woodbury's photo-relief printing shows decided progress: some of the recent examples, in brilliancy, delicacy, and sharpness, being indistinguishable from fine silver prints. Its second application to book illustration has just been issued in the shape of a fine portrait of Professor Huxley, which appears in the May number of the *Popular Science Review*. An establishment has been organized at Manchester, in which is fitted up the first of Mr. Wilde's machines for supplying the electric light, described in our pages a few weeks ago. By the aid of this, over two hundred negatives can be exposed in a day, to secure the gelatine reliefs. This is the first practical application to the commercial working of photography of the electric light, its constancy rendering it here more valuable than an uncertain sunlight.

Photo-Lithography at the Dramatic Fete.—Mr. H. B. Pritchard has made photo-lithography available for some clever contributions to the Dramatic Fête, to be held at the Crystal Palace on the 6th inst. One consists of about a score of autographs of popular actors and actresses, arranged around the Dramatic Almanac for 1866, which is in the form of a neat medallion in the centre. Another is a presentation plate, which will be distributed at Chinese Exhibition, which Mr. Paul Bedford and Mr. J. L. Toole have devised as an attraction at the fête. This presentation plate will be eagerly sought after; but we cannot describe it in detail here.

POSTPONEMENT OF THE PHOTOGRAPHIC EXHIBITION AT GHENT.—We call the attention of our readers to a communication announcing the postponement of the intended photographic exhibition at Ghent, in consequence of the disturbed state of traffic arrangements on the European railways, arising out of the war. Both Mr. Dallmeyer and Mr. Ross have favoured us with communications, enclosing copy of the letter of the Secretary, announcing this determination, which will be found in another column.

THE PHOTOGRAPHIC SLANDER CASE.—The reference in the action for slander, brought by Mr. Ernest Edwards against the Earl of Cardigan, came before Mr. T. R. Williams on Wednesday last. The decision has not yet been made.

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To Correspondents.

A. WARD.—The yellow spots in the print forwarded are spots of imperfect fixation. The hypo solution has been old or weak, and it is probable that the print has been stuck to another, so that the solution did not permeate it properly. 2. Prints by development can be obtained by the solar camera without sun, but of course the exposure will be much greater. 3. Probably about fifteen minutes. 4. From five minutes to half an hour, depending on circumstances.

R. H.—Photographic enlargements for colouring in oil, if mounted on cardboard, should be rolled, where it is practicable, to secure a smooth surface. The surface should be then treated with a size of some kind, to prevent the absorption of the oil. Gelatine, Salisbury glue, or isinglass may be used. The latter, dissolved in gin by the aid of gentle heat, is a favourite sizing material with many artists. It is difficult to give exact proportions, as the materials vary in character. If the size be too thin, the oil will sink into the paper; if too thick, it will be apt to crack off the print. It is better to apply it thin, and when dry, try one corner of the print; if the colour sink in then, give it another coating. It should be applied warm, with a flat camel-hair brush.

M. AND R.—Bitumen of Judæa has been so little used of late years in photography that it is doubtful whether it is usually kept by photographic chemists. It is probable, however, that a firm like Hopkin and Williams, New Cavendish Street, will supply it.

BANDON.—Add two or three times as much alcohol to the silver solution, and sponge the surface with alcohol before applying the silver solution. 2. When a print turns black on application of a solution of gallic acid, it is suggestive of the general action of light. Development printing requires as much care to avoid light falling on the sensitive surface as is necessary in working the wet collodion process. The absence of acid in the gallic acid solution is sometimes a cause of general blackening.

S. W. R.—You do not state whether your toning bath has become decomposed and the gold precipitated, or whether it is simply colourless and inert. If the latter, the addition of a few drops of a fresh solution of chloride of gold will probably restore its action, or the addition of a drop of hydrochloric acid. The strength you have been using is too great; as a rule, one grain of chloride of gold to six of water will form a good working solution. It is probable that your acetate of soda has been a little alkaline, in which case, as you neutralize with chalk, the solution would become alkaline, in which state it would soon cease to tone, and eventually decompose and throw down the gold. It is a good plan to keep your gold in a concentrated solution, without any addition, say a grain of chloride of gold to each drachm of water. Make as much of this into a toning solution as you may require from time to time, two or three days before you require to use it adding thirty grains of acetate of soda and five and a half ounces of water to each drachm of the solution. Test it, and if acid to test-paper, add a little chalk; if not, make no addition. The addition of chalk will not make the solution alkaline, but neutral. Either nitric acid or iron would tend to decompose a toning bath, but if your hands are washed quite clean after contact with these materials, there ought to be no danger to the bath. Add one grain of chloride of gold after the toning of two or three sheets of paper.

GLASS POSITIVE.—If your glass positive be a brilliant and good one, the best plan is to copy it the same way that you would any other picture. If it happen to be wanting in vigour from over-exposure, it is sometimes possible to get a good result to produce the negative at two operations; first get a good transparency by camera printing, using the positive as a negative, and then proceed in the same way to obtain a negative from the transparency. You will find details in our YEAR-BOOKS of the best mode of going about this.

SUBSCRIBER.—The stains you describe may arise from various causes, and are often troublesome in warm weather. The use of a strong silver bath in hot weather is conducive to stains; slightly diluting the bath will often lessen the risk. Immersing the plate before the collodion is too much set will keep the film moist longer, and prevent stains from partial drying. The use of a piece of wet blotting-paper at the back of the plate will check its drying. Thoroughly washing the inner frame each time, or placing a piece of clean blotting-paper each time in the corners upon which the plate rests, will often prevent stains arising from the drainings coming into contact with the frame. The use of a horny and repellent collodion in hot weather often tends to induce rapid drying of the film, causing stains. You will find the question somewhat fully treated at page 577 of our last volume. 2. To get uniformity of film in a number of large plates, never use more than half the quantity in the collodion pourer, replenishing from time to time from a stock bottle. About equal parts of ether and alcohol answer well, both for making the collodion and for diluting it when it is too thick.

ST. FILLANS.—We cannot, with certainty, point to the cause of the fog you mention; but it may arise from two or three causes. The too long continued application of the plain pyro in developing will sometimes tend to produce it; or the use of too small a proportion of citric acid in the silver solution, in the next stage of the development. The silver bath being neutral; the albumen solution not strong enough; or excess of ammonia in the preservative, all may tend to the same result. The first remedy we should try would be to avoid a prolonged application of the plain pyro, and to add more citric acid in the next operation. We are glad to hear of your success in all points except this tendency to abnormal deposit; we heard of the same defect in other hands. If we learn further particulars, we will let you know.

DESPERANDUM.—The only mode in which you can secure quicker pictures will be by increasing your amount of light, or using a quicker lens. The amount of light through a window six feet six inches square is not very great. The use of an equal light at both sides will tend to destroy relief and modelling in your pictures, without much reducing the exposure. We do not know much about the lens you mention, but if you had stated the aperture of the stop instead of describing it as "medium," we could have formed a better opinion. With the amount of light you have, however, we do not consider that from eight to twelve seconds is a very long exposure. If you can extend your side-light further to the front of your sitter two or three feet, you will find it an improvement. The prints enclosed are lighted too uniformly on all sides, and the negatives are a little over-intensified. 2. In producing magic photographs, you may print about the usual depth. The hypo of the ordinary fixing bath will answer.

PUZZLED.—It is quite possible that the solution should be acid whilst the gold is thrown down at the bottom of the bottle. The explanation is this: you probably neutralized the toning solution, and then left it standing in the light. The gold and chlorine are in a state of such loose combination that they readily part, unless excess of acid be present, the gold being thrown down as a metallic powder, and then diffused through the water. By the action of light on this chlorine water, another decomposition is produced in a portion of the water, in which oxygen is liberated from the water, and the chlorine uniting with the hydrogen forms hydrochloric acid; and thus you find the solution acid, although the gold is thrown down. A toning solution which is neutral, or nearly neutral, ought to be kept in the dark. The smallest trace of free chlorine present in a neutral solution of chloride of gold will prevent decomposition.

J. H. C.—It is an unfortunate practice of some manufacturers to make too high claims for their productions, and it is probable that the lens to which you refer has been too much vaunted as possessing every imaginable perfection. But in the matter of which you complain, we believe there is no fault in the lens; so far as we know, it is free from distortion. The convergence of the upright lines towards the top, in the examples sent, are not due to any fault in the lens, but to the position of the camera, which has been tilted. In your anxiety to get in the top of the tower and of the steeple, without retiring further from the building, you have tilted the camera, so as to make the lens look upward, and this, unless you employ a camera with a swing-back, must inevitably produce converging lines. Remember, however perfect your lens, that in taking a building, you must always have the sensitive plate quite parallel with the building, otherwise this convergence of lines must follow.

J. H. T.—The word "bad" is a purely relative term, and cannot, therefore, be properly used in an absolute sense. Regarding the pictures enclosed, we should not think the term correctly applicable. The copy we should call on the whole good; although a little wanting in brilliancy, it is better than the average of such copies. The portrait is a little wanting in brilliancy, but it is well lighted and clean. Its chief defect appears to arise from the imperfect covering of the lens, and the figure is too low on the plate. If your sight fails you, we cannot tell you how to get an accurate focus. The use of a focussing glass will help you a little; but it requires a little practice to acquire the habit of using one successfully.

COLLODION.—We have met with cases in which the collodion, when first mixed, became blood red, and in the course of a few hours became quite colourless. It is generally where methylated spirit is used. We cannot entirely explain the cause; but it does not necessarily affect the working of the collodion. It is possible that a trace of acetic ether, acting on the iodides, liberates free iodine at the first contact, causing the red tint, and that a little of some alkaline contamination present, not readily soluble in ether, gradually reacts upon it, neutralizing the acid, and the iodine is again taken up by the base. For a positive collodion, you may employ the following proportions with advantage:—From 4 to 5 grains of a suitable cotton, 2 grains of iodide of ammonium, 2½ grains of iodide of cadmium, 1 grain of bromide of cadmium, in an ounce of solvents consisting of equal parts of ether and alcohol. If the materials are good, this will give you a good positive collodion.

PORCELAIN BATHS.—A correspondent, whose letter has been mislaid, speaks of the glaze of his porcelain bath cracking, and an appearance of crystallization being seen outside the bath. The sooner he discards the bath the better. Use either glass or vitreous ware in future.

EAST.—The yellow stains on the print No. I are the result of imperfect fixation, the hypo solution being old or weak, or the prints not properly immersed. 2. The white stain of reduced silver on the negative may arise from several causes, but the most probable cause is contact with the inner frame, which is not perfectly clean. Thoroughly wash the inner frame frequently with clean water. 3. The large head is very good. We have never met with a case in which a print became lighter on drying.

M. CAGE.—Some samples of pyroxyline are soluble in strong alcohol; and it often happens that a sample of collodion which has become somewhat decomposed from keeping gives a film which is dissolved by the varnish. A benzole or chloroform varnish will not dissolve your film; sometimes applying a spirit varnish cold, and when it has set, and bloomed, holding the surface to the fire until it is transparent, is a mode of getting over the difficulty. Perhaps the safest plan is, before drying the film, to coat it with dilute gum-water; this forms a thin film over the collodion, and protects it from the subsequent solvent action of the varnish. 2. Several causes might produce the effect you mention in your bath. Again make it alkaline with a little carbonate of soda, sun thoroughly, and try again.

G. WALLIS.—The stereographs are many of them very good. If you send us some particulars of the subjects and scenes depicted, &c., we shall have pleasure in noticing them. At present we have no idea of the whereabouts of the scenes.

Received, "The SILVER SUNBEAM," by Dr. Towler. Fifth edition.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHY AND ART IN PORTRAITURE.

There is no antagonism more foolish than that which a certain class of shallow critics would set up between photography and art. Even admitting for a moment the position that photography is not a fine art, it must be inevitably admitted that the two are at least closely allied, and cannot possibly be in antagonism with each other. It is with no aggressive spirit, and with no disposition to be the indiscriminate advocate of photography, that we make a few remarks on the comparative power of the photographer and the painter in portraiture, and suggested by an examination of the portraits in the present exhibition of the Royal Academy.

One of the common forms of depreciation in speaking of photographic portraits has been the complaint that photography has no power to idealize. That a portrait should be idealized is taken as a foregone conclusion. The notion that the artist should invest his sitters with a grace or a nobleness not their own seems never to have been doubted. Dr. Johnson said, that it was one of the highest proofs of the genius of Sir Joshua Reynolds, that he contrived to give nobleness to the head of Goldsmith in his portrait, whose genial soul and fine intellect were not habited in a very dignified or handsome body. If Reynolds gave to Goldsmith a nobility of countenance which nature had denied, but which the painter conceived was more characteristic of the inner man than the actual presentment, then we have in the portrait Reynolds' conception of what Goldsmith ought to have looked like, and not the actual portrait of the man. If he merely depicted him at his best, happily catching the expression which lit up the face when it was a-glow with some unusually happy thought, then he did not give Goldsmith the noble look, but, with the true painter's skill, readily detected the noblest effect, and gave permanent form to a transient expression. This it is the prerogative of the painter, in many sittings, during many hours, to effect. It would be equally the preorogative of the skilful photographer, with a tithe of the time and opportunity, if either were afforded him; for if the highest duty of the painter is to seize and to perpetuate the best actual expression presented to him, photography can do that more rapidly and efficiently than the most skilled hand can be expected to effect it. Photographs, it may be admitted, then, are rarely such noble portraits as the skilled painter can produce, simply because the photographer rarely has such opportunities, in the few brief moments often given up to sitting for a photographic portrait, of seeing and securing the best phases of his sitter's countenance, as are afforded to the painter.

But this is not all the painter's art: he frequently does something more, which is called idealizing, and often *is* flattering, and which the public like. A recent article in the *Pall Mall Gazette* has some admirable remarks on this subject, some of which we quote:—

> Scarcely a single portrait painter has the courage to attempt to represent actual nature as she shows herself in those who come to him. From beginning to end he never thoroughly studies the art of really representing the "human face divine," and his one aim is to represent the "human face pictorial," so as to please a foolish generation, and establish a profitable connection. Meanwhile, he flatters himself that he is not a Carlylese "sham" or "windbag," but rather a worshipper of the "eternal veracities," by averring that it is not the province of art to represent men and women in their dull, bored, or common-place aspect, but to paint them as they appear "at their best." If he is ambitious or philosophizing, he adds, that a portrait should exhibit not the mere eyes, nose, and mouth of a man, but his inner life and character, and should speak to the spectator as if the living man himself was conversing before you. To all which pretended justification of foolishness and failure it is to be answered—first, that there is only one way to paint a man at his best, namely, to paint his features with the same unswerving accuracy as if you wished to paint him at his worst; and secondly, that to attempt to represent inner life and character by altering and improving those features through which alone character is made visible, is about as absurd as it would be in a violinist to put the strings of his fiddle out of tune, in order to play on it with more touching and true expression. When a generation of artists has arisen who will hold and act upon the principle that all attempt at beautifying or prettifying the human face in portraiture is as irrational, unartistic, and destructive of true beauty as was the whitewashing of columns and delicate traceries and elaborate oaken carvings by which the churchwardens of the past delighted to give a "neat and chaste" look to venerable churches and cathedrals, we may then hope to see English portrait painting rise to its natural level, and be recognized as an art worthy of the devotion of the very ablest of painters.

Nothing could be more to the purpose than these plain, vigorous words on the folly of supposing that modifying the features, straightening noses, enlarging eyes, diminishing mouths, &c., are legitimate modes of idealizing a face, or painting it at its best. If the truthful rendering of the features with the best expression the mind can infuse into them be true art in portraiture, then we can see no reason why, in competent hands, photography should not be as capable, within its own range and style of course, of producing true art in portraiture as any other of the graphic arts. Very rarely has the photographer the opportunity, however, of securing the best portrait of his sitter: too few photographers have the capacity of seeing and seizing that best when it is before them; but this is the shortcoming of the artists, not of the art.

On the disrelish of the public for the simple truth in portraiture, the writer we have quoted has some excellent remarks. He says:—

> Not one sitter in a dozen wishes to appear *in propria persona*, just as he appears to the eyes of his fellow-creatures. He, or

she, desires, even when not venturing to avow it, to have every objectionable element in his or her face judiciously toned down, with the addition of an expression to the whole countenance designed to embody some one or more of the Christian or the social virtues. Besides this, even where vanity is less sensitively critical, most men and women are very much astonished at perceiving that they appear in their portraits, not merely less handsome and intellectual than they have imagined themselves, but that they have, for some mysterious reason, not at all the kind of look which their looking-glasses have told them they possess. The reason is, however, obvious enough. In very few faces does one half exactly correspond with the other half. The two eyes, or the eyebrows, or the two sides of the mouth, even the two sides of the chin, and the forehead, are sufficiently unlike one another to constitute a distinct difference in feature. As for the nose, it is rare to find that it is not slightly atwist, in many cases so decidedly inclining either to one side or the other as to give a positively different expression to the whole countenance, according to the way the head is turned to the spectator. Accordingly, when the sitter is amazed at perceiving that the two sides of his face have apparently changed places upon the artist's canvas, he forgets that the real change is effected by his looking-glass, and that the picture represents him as he appears to other people, and not with the characters of his left side transferred, as by the mirror, to his right side. Hence he is seldom thoroughly satisfied, and adds his grumblings to the general chorus of complaint with which the world of sitters—past, present, and expectant—attack the world of portrait-painters.

A glance at the portraits in the present exhibition of the Royal Academy will afford the intelligent visitor with some curious matter for reflection. We had hoped to see, in the works of painters untrammeled by the conditions which bind the photographer within certain limits, something of invention, of freshness of treatment, which might be at least suggestive to the photographer. Notwithstanding the presence of many excellent portraits, we looked in vain for the higher qualities which might even more effectually distinguish painting from photography than the mere power of giving colour as well as form. It has been well remarked, that photography has had a beneficial influence on painting, by inducing painters to paint with more literal truth of detail. We are here struck with the fact that photography has had another influence on painting, which is less desirable. We notice that the conventionalities of background and accessory, which photographers borrowed from fifth-rate artists, and then contrived still further to vulgarize, are strikingly prevalent, in forms which are full of photographic suggestion. The column, the curtain, and the balustrade are apparently sacred to portraiture, and we will not now attempt to lay profane hands on them; but we scarcely expected to see, in a well-painted life-size picture, a plain background, with dado, covered for about one-third of its width with the vulgar and inartistic slip, containing a terrace with very liney tesselated pavement, so common in third-rate card pictures. The proportion and shape of many of the portraits are essentially suggestive of photography, the majority of the full-length pictures having exactly the proportions of the ordinary carte-de-visite, which, however convenient in the small photograph, is undoubtedly too narrow in large pictures; and in some of these paintings we find the ample dimensions of a lady's dress cut off just in the same manner we occasionally find it done in the card picture. In some cases, the photographic characteristic is carried further, and we have excess of top-light and under-exposure painfully suggested. A group of a lady and two children, painted by an R. A., is a striking example of this kind, and is as vulgar as scores of such groups to be found amongst the specimens of the least competent and least cultivated photographers.

We should very much have preferred to recommend a visit to the Academy to photographers to study portraiture as produced by its ablest representatives. There are a few very noble examples; one especially we may mention, the portrait of Dr. Quain, by Maclise, which, with some faults, is a fine, solidly-painted, intellectual portrait; but it is not amongst the portraits, as a rule, that much will be learned of art. There is plenty of prettiness, and more than enough of conventionalism; but very little of the art which will elevate the student. To the paintings generally we do not here allude; our remarks refer solely to the portraits. Amongst the pictures there are many that will well repay most careful study.

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TINTING PHOTOGRAPHS BY LITHOGRAPHY.

We recently called attention to a method of giving a flat tint to the backgrounds of photographs, by means of lithography, for which letters patent were in progress, a provisional specification having been entered by Messrs. Southwell Brothers. Our friend Mr. Blanchard has since recalled to our memory that a patent for a similar application of lithography was obtained nearly four years ago by Messrs. Dixey and Smith, of Brighton. The method adopted by these gentlemen consisted in placing a piece of tracing-paper on the photograph, and marking the outline with a pencil. The figure, or as much of it as might be needed, was then cut out and attached with a little gum-water to the photograph, so as to form a mask protecting the face and other lights. The print was then laid on a lithographic stone inked with the proper tint, and run through the press. When this was dry, a piece of canvas (or other material of suitable surface) was laid on the photograph, and the whole submitted to pressure so as to produce upon the photograph a texture resembling that of drawing-paper. The picture was then finished in water colours, and lost all appearance of a photograph, having the effect of a highly-finished water-colour drawing, an effect obtained by comparatively slight labour, the tint and the texture obtained, as we have mentioned, materially aiding the result. The price obtained for these portraits was, we believe, about ten guineas each. The method we recently mentioned, as proposed by Messrs. Southwell Brothers, whilst lending itself admirably to the purposes of the colourist, was more especially intended for use with plain photographs, giving the effect of a picture on a neutral ground, like an India tint, with pure white lights. The method they propose is so nearly identical with that before patented, as to prevent, we think, the possibility of a second patent being obtained; and as that already in existence has recently been suffered to lapse, such advantage, as the method possesses, is public property. We subjoin the specification, which has not before appeared in our columns:—

Having procured a good negative photograph in the usual manner, we carefully block out the background with opaque colour or paper, in such manner that the background shall not print, but remain on the printed photograph white. After having procured a print off the negatives with a white background, after the manner described, we fix, tone, and wash in the usual way, with careful printing, and thus obtain a photograph ready for the following tinting, embossing, and colouring:—First, lay the photograph upon a flat board, and upon that a piece of tracing paper large enough to cover the photograph; then, with a lead pencil, trace carefully the outline of the photograph, which done, remove the tracing paper, and cut out the outline of the photograph which we wish to preserve from the tint about to be applied; fix this upon the photograph by a little gum, carefully registering the outline of the photograph, for where this tracing paper does not cover there will be the tinting, which was intended only for the background, and not for the portrait or landscape photograph. This being done, the tint of the desired colour is rolled on the lithographic stone, and printed all over the photograph in the usual way of lithographic printing; the tracing paper which was fixed to the photograph, having prevented the ink from touching the print, may now be removed with a damp sponge. We shall then have a photograph with an evenly tinted background, and should we desire to give the print a tint all over of any lighter colour, we print again with the lithographic press all over the picture unprotected by the tracing paper, which, in some instances, improves the general tone of the photograph. Second, the photograph may now be embossed to give it the appearance and advantages of drawing paper, which is performed thus:—Damp the photograph between some sheets of wet blotting-paper, then lay it upon a block cut, engraved or engine-turned, of any design you may please; but the simplest way is to lay it upon a fabric of silk or alpaca, twill, or other fabric that has the resemblance of wire mark, such as the drawing papers usually show impressions of; then put the paper and block or fabric, the impression of which you wish to give the photograph, under a lever or other press with several thickness of blotting-paper next the photograph, between it and the press; submit it then to a severe pressure, and the photograph will have the impression of the fabric or block used, and should then have very much the appearance of a photograph taken upon drawing paper with a fine even background tinted. Third, the photograph may now be mounted on cardboard, and is then all that the artist employed to colour it can wish. The tinted background gives relief to the photograph, and the embossed paper is a desideratum which cannot be too fully appreciated by the artist; if skilfully coloured with water colours, the photograph has the appearance of a superior coloured drawing.

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THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Permanency a Comparative Term—Fixing Photographs, etc.

Among the manifold lessons which nature silently conveys to intelligent observers, there are none which creates so profound an impression as that which points to the changes wrought on all terrestrial objects by the relentless hand of time. So universally are its destructive powers exercised, that the term permanency, as defined by lexicographers, cannot be applied to natural objects in its literal meaning, and must, therefore, of necessity, be relatively considered. As an absolutism it might, under certain restrictions, be attached to simple matter, but even that can be regarded as permanent only so far as its actual indestructibility is concerned, as its proneness to enter into new combinations proves it not merely liable to change its character, but that it continues to undergo changes as time rolls on and on; and the reason why such continued metamorphoses escape notice is because of the shortness of life; because of the limited power of the human mind, which renders it incapable of traversing freely beyond the circle of its contracted existence. True, we perceive on all sides evidences of natural decay: the naked sides of yawning precipices; the bald heads of towering mountains; the suspended atoms in rushing waters; the blunted edges and other defacements of man's handiwork, or the gradual obliteration of creations on canvas, which, even in their declining beauty, cause their gifted authors to hold a place on the pinnacle of fame. Yet, despite the evidences thus offered, we cannot divest ourselves of the erroneous impression which the term permanency, when applied to our own work, conveys. We accept it as absolute, and prefer holding it as such rather than undeceive ourselves by admitting the term in its true comparative sense.

Doubtless the motive power which prompts men on to mighty achievements is a longing for the imperishable, a desire to hand down name and work to posterity; and these desires extend not only to their names and work, or the recording of deeds, which the painter's skill and printer's type only can perpetuate, but a very natural wish is felt that the living form in which their busy spirits breathed, should exist in facsimile until the end of time; hence the labours of the sculptor and painter have been through all ages eagerly appreciated and often liberally rewarded, whilst the anxious patrons, seeing no change in paint or marble, became content, never dreaming of peeling varnish, torn canvas, or hideously defaced stone. Until the beautiful art of photography removed the barrier of exclusiveness, portraiture was a luxury enjoyed solely by the favoured few; but with the discovery came an opportunity for the most humble, which has been so eagerly embraced, that at the present moment there exists no cottage home (however lowly) throughout the length and breadth of our land which does not contain portraits of relatives or absent friends. This at first glance is a cheering fact, but our glowing thoughts are soon dimmed when we consider that objects in many instances so valued, are doomed to speedy decay—a decay rendered more annoying by its occurrence during our own lifetime. We cannot be astonished, therefore, to find that every measure proposed to effect a greater relative permanency in photographic productions is received and examined with anxious attention by every true follower of the art whose mind is sufficiently unbiassed to receive light from high or humble sources.

As these preparatory remarks bring us to the second and practical portion of the present paper, I now proceed to describe the changes which occur during the process of fixing a photographic print with hypo, and shall endeavour to point out the actual cause of fading, and the preventative influence exercised by the oxydizing agents recently suggested.

A print, when it leaves the toning bath, contains, in addition to the reduced chloride in various stages of reduction, free nitrate of silver in minute quantity, a slight coating of gold, and unreduced chloride, which renders the picture still sensitive to light. On immersing the print in an hypo solution, a chemical decomposition immediately ensues, which will be best described and illustrated by the following simple experiments:—

Take three test-tubes or phial bottles, and pour into each a small quantity of solution holding in brief or permanent suspension a slight amount of chloride of silver, and in solution a trace of free nitrate. Now take a very dilute solution of hypo, and pour a drop or two into tube No. 1, when a change is immediately perceptible, which ends in a copious precipitation of a dark-coloured deposit, which is in reality a precipitate of sulphide of silver. Proceed then with tube No. 2; but immediately the slightest trace of change in colour is visible, pour a quantity of the hypo, in a more concentrated form, into the mixture, and instead of a black deposit being formed, light flocculent particles will be observed, which consist of hyposulphite of silver. Now proceed with No. 3, by pouring into the tube a quantity of the stronger hypo solution, when it will be seen that the solution so treated remains perfectly clear, a double salt of hyposulphite of silver having been formed, which is soluble.

The experiments described point, first, to the necessity of employing a fixing solution sufficiently concentrated to form at once the soluble double salt; and second, to the cause of fading.

In our first experiment it was clearly shown that a minute trace of hypo is sufficient to produce, by double decomposition, the sulphide of silver. Now, if the soluble double salt and excess of hypo could be entirely eliminated from the print by washings in water under ordinary conditions, the picture might be pronounced relatively permanent; but in practice it unfortunately happens, that however long the washings are applied, however carefully they are conducted, a trace of hypo remains to work destruction, and the union which eventually ensues between the hypo sulphurous acid and the silver in the print is precisely similar to that described in experiment No. 1. The trace of liberated acid is so slight, that on combining with the silver, it is unable to form anything else than the sulphide of silver—that greenish-yellowish, abominable monster, which eats up every trace of former beauty. It will now be clearly seen how important it is to eliminate by chemical means what long practice has shown cannot be removed by mechanical efforts; and it is gratifying to find that two agents have been found capable of effecting, by chemical means, the desirable object. These agents are now well known as peroxide of hydrogen and hypochlorite of soda. The Editor of the News has so ably and clearly explained the process by which the hyposulphite is converted into a sulphate, that I need not (nay, cannot) enlarge on his exhaustive remarks; it remains only for me to dwell for a moment on the comparative advantages. On the actual results, our esteemed Editor has shown they are one and the same; on the score of cheapness, Mr. Hart's method possesses decided advantages; and on the grounds of certainty and simplicity, the palm must be yielded to the hypochlorite of soda; and the delicate test introduced by Mr. Hart places in the hands of photographers a certain guide. I have heard from several quarters foolish remarks about the dangers arising from bleaching, possible and absolute, concerning the formation of chloride of silver, and subsequent blackening of the print. I believe that even in the absence of the sure remedy offered by Mr. Hart, the presence of chloride of silver is a bugbear which, like a rustic ghost, is more feared than real. I have sought in vain for it by chemical test, but as certainty is desired, certainty happily is within easy reach. I should deem myself culpable if in my own practice I neglected the precaution so cheaply offered; and I for one give publicly my hearty thanks to Mr. Hart for the valuable agent he has placed in my hands. I might perhaps be accused of writing up the gentleman named from interested motives; but if I am fairly judged by preceding papers, it will be admitted that I never lend my pen to anything save the best interests of photographic science.

Before concluding the present paper, I wish to direct attention to the often-felt presence of sulphur in a stage of operations where it is impossible by any subsequent treatment to remove the disastrous effects it occasions—I refer to yellow stains on portions of the prints—the first washing water becoming thick, black, and muddy, on immersing the prints, which is followed by an inert toning bath and yellowness of whites. These are caused by the presence of hypo—first, on the fingers; second, in the vessels employed in washing. Too much care cannot be observed in keeping the washing dishes free from even the slightest trace of hypo; for I can assure you, courteous reader, many freaks of the toning bath might with justice be attributed to the unpalatable dose of sulphur previously administered to the prints, on whose surfaces have been formed a deposit of sulphide of silver which is more or less apparent, according to the amount of sulphur administered. By all means wash the dishes thoroughly before trusting the pictures to their care, for a drop of hypo will frequently find its way into them by means unknown; and I repeat, to this cause might be traced the unsuspected reason why of many a failure which occurs during printing operations.

BLOOD-RED COLLODION, AND ITS SPONTANEOUS BLEACHING.

BY T. L. PHIPSON, PH.D.

It has been more than once observed that collodion soon after mixing becomes blood-red, and then, in the course of a few hours, perfectly colourless again. This occurs not only when methylated spirit has been used, but sometimes with ordinary alcohol.

The red colour is doubtless owing to *iodine* which is set free, as everyone will at once admit, and which can moreover be proved by direct experiment. This liberation of iodine appears to me to be owing either to *nitrous acid*, which acts immediately on iodides, or to *ozone*, which likewise decomposes them. It is now some time since M. Gaillard showed that whenever alcohol and ether—which, in contact with pure white iodide of potassium, became slightly tinged in a few hours—were used to prepare collodion, the latter inevitably became dark red. This author does not give any explanation of the phenomenon, but in 1856 I showed that ether, like essence of turpentine and a considerable number of other organic compounds, in contact with the air occasioned the formation of a certain quantity of ozone.

As to the spontaneous bleaching of collodions which have become red as above, it is evidently owing to the formation of iodide of ethyl or iodide of methyl (when wood-spirit has been used) compounds, which are perfectly colourless, and the conditions of formation of which are fulfilled in any collodion which is in the slightest degree acid.

CARBON PICTURES ON CANVAS.

BY M. DESPAQUIS.*

The principal topic of interest in the photographic world at the present time is "enlarging." The apparatus intended to produce enlarged photographs multiply daily: the processes for obtaining them occupy the chief place in all the publications—periodical or non-periodical—which treat of the art of photography. Like others, we are occupied with the subject. The papers, the formulæ of which we give, yield magnificent results in this application. The process of transferring by the aid of collodion or by prepared paper is in no respect inferior in beauty, splendour, and delicacy to the best of those obtained with the aid of metallic salts.

These results have induced us to make new experiments to ascertain if we could not obtain upon canvas as beautiful proofs as those which charm us by other processes. In this new idea will be seen a series of novel applications and means of ornamentation and decoration which hitherto have never been demanded of photography. The variety of colours that may be obtained, the unexceptionable solidity of the support, must, in fact, open a new path to photography.

We set ourselves to work, and at first despaired of success. The canvas became impregnated in such a manner with the sensitive compound, that it was impossible to disembarrass it from a sort of dye which penetrated to the centre of the fibre. At that time we thought of protecting it from the immediate contact of the bichromated solution by a varnish but here a new difficulty presented itself. Under the action of heat, the bichromate either decomposed the subjacent film, or it penetrated the varnish in such a manner as to render it completely useless. It was necessary, therefore, to find a substance sufficiently inert not to cause the decomposition of the oxydizing salt, but which was at the same time impermeable and insoluble in the warm solution which it must support. After numerous experiments, and seeking everywhere the solution of the problem we had started, it occurred to us to employ a varnish having Burgundy pitch for a basis, which immediately gave us the best results. We have since tried a good many other varnishes, and have found several which protect the fibres of the canvas equally well, but none have succeeded better than Burgundy pitch, so we shall speak only of that, both on account of the facility with which it may be everywhere obtained, and its moderate price.

The following is the method adopted:—

Take a piece of fine and close linen or calico, and extend it evenly on a frame with the aid of flat pincers, and cover it with a coating of Burgundy pitch dissolved in alcohol, and leave it to dry; then apply another coating, and repeat the operation until a somewhat glassy surface is obtained. In this manner not only are the fibres impregnated with the resinous matter, the interstices are also filled up. Upon the canvas thus prepared we pour a coating of bichromated gelatine by the processes described for paper, taking care that the layer be sufficiently thick without being too much so. To arrive at a constant result and perfect regularity, we have constructed a machine which enables us to apply the gelatine in a perfectly equal manner, and so economise a part of the hand labour which a non-mechanical spreading necessitates, besides giving a more perfect result. We hope to be able to popularize the employment of this new support. The canvas, thus prepared and dried, is employed exactly like paper; we can expose it under a negative, either directly or by putting the sensitive coating in contact with the negative, or by printing it through the canvas. In this latter case the grain of the canvas produces on the picture a "line" effect, which gives to it the appearance of an engraving, which has a very pretty effect.

We have also employed the enlarging apparatus either to obtain a direct image by the usual process, or to obtain a negative proof of large dimensions, which enables us to print by contact a great number of exactly identical proofs of the same subject, which is difficult, if not impossible, by the ordinary methods. In fact, if we wish to obtain a negative upon glass of very large dimensions, we must employ fragile, heavy, costly glasses, and a very difficult preparation. This is proved by the fact that this means of enlarging original proofs has been very little employed, and only for dimensions not exceeding forty inches. If, renouncing glass in producing an enlarged negative, we have recourse to paper, the weight and preparation are no longer embarrassing, but, on the other hand, fragility is in some measure increased, while it is difficult to manipulate a large sheet of paper in the baths without tearing it. Canvas presents none of these inconveniences; the manipulations are easier and more rapid. As to durability, it is not necessary to dwell upon the evident superiority of canvas over glass and paper: besides, the "line" effect, referred to above, produces a still more agreeable effect upon proofs of large dimensions than upon small.

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* From "Photographie au Charbon."

Without pointing out the numerous applications that canvas presents for maps, plans, &c., we may say that we have obtained transparent blinds with most charming effect, and which possessed the advantage over those produced in the ordinary way of perfect photographic drawing.

◆

ALKALINE SALT OF SILVER FOR RAPID PRINTING OF POSITIVES.

BY M. OMMEGANCK.

The numerous experiments for a long time pursued with the object of imparting greater sensitiveness to nitrated positive paper have not yielded very satisfactory results. Ammoniacal fumigations, and the employment of the double nitrate of silver and ammonia, while effecting a more rapid printing, indispensable for ordinary printing during cloudy days, and especially for enlargements upon paper, nevertheless present many inconveniences.

In the first place, the immediate employment of the paper is indispensable—it will not keep; then a complete washing before toning, so as to remove all the ammoniacal salts, and all the nitrate of silver also, renders the toning slower and more difficult. On the other hand, as a small quantity of the ammoniacal salt remains in the paper, the toning of the first proofs is magnificent, but it removes so much gold from the bath, that it becomes necessary to employ ten times as much as usual, which becomes very onerous.

In preparing some salts of silver for sensitizing paper, we have observed certain remarkable effects as to the difference of activity in printing effected by certain combinations. The results we have obtained give a rapidity at least double that obtained from the ordinary nitrate: we must, for the present, confine ourselves to merely announcing this fact to experimenters, reserving the publication of the mode of preparing the salt in question until we have made a complete study of it.—*Bulletin Belge de la Photographie.*

◆

PORTABLE APPARATUS FOR WET PLATE PHOTOGRAPHY WITHOUT A DARK TENT.

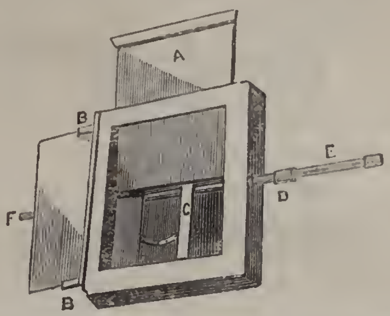
BY NELSON WRIGHT.

[The *Philadelphia Photographer* gives the following description and diagrams of an arrangement for working wet collodion without a dark room or tent, which has been recently patented, in the United States, by Mr. Nelson Wright.]

The apparatus consists of four separate parts. The camera, which is of the ordinary construction; the plate-holder (fig. 1), of the usual size, but of a peculiar construction; the silver bath, same size and style as those in ordinary use; the developing tray (fig. 2), of the same size as the silver bath. The above articles, with a tripod stand, a box of clean plates, bottle of collodion, and iron developer, and either a cyanide or glycerine solution, comprise all that is necessary for a day's work in the field.

The camera, being of the usual construction, needs no description.

Fig. 1.



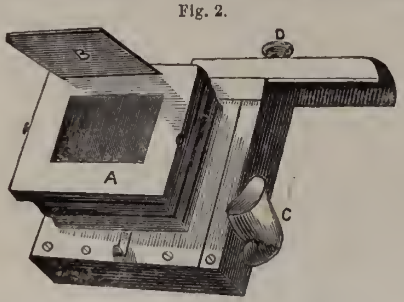
The holder (fig. 1) is made of the ordinary size, and with the usual slide in front (A), but instead of containing the ordinary corners, has grooves upon the sides, and an aperture in the bottom; the back, or door, instead of being hinged, is constructed in a manner similar to a dry plate-holder. There is a hard rubber carriage (B B) grooved to receive the plate, fitted accurately to the holder, open at the bottom, but connected at the top by a cross bar (C), to which cross bar, a hollow rod (D) is attached, passing through a light tight aperture in the top of the holder, and is prevented from sliding through by a knob at the top. Through the hollow rod runs a solid rod (E), at the lower end of which is a hook, and at the top a knob to prevent it from passing entirely through the hollow rod. The hollow rod is only long enough to allow the lower ends of the carriage (B B) to pass through the aperture in the holder, two inches, while the solid rod is of such a length that, after it has passed down the hollow rod, the lower end, or hook, will be extended below the lower end of the carriage (B B) the width of the negative plate to be used less about half an inch. The solid rod, being round, can be easily turned, and the nose upon its lower end brought into any desired position.

The silver bath is of the usual construction, but fitted with grooves upon the top, in which works the cover, which can be made water-tight by turning a knob; and upon the bottom of the holder (fig. 1) is a hard rubber face projecting at the sides, fitted accurately to the grooves upon the bath, and upon the developing tray (fig. 2), and has, upon the end, a catch for the purpose of attaching it to the sliding covers of the silver bath and developing tray.

The mode of operating the holder and bath is as follows:—The holder is laid upon its back, upon the top of the camera, with the ends of the carriage projecting from the bottom, the solid rod extending below, with the hook turned out of the way. The plate is then coated with collodion, placed in the grooves of the carriage, the solid rod turned so as to bring the hook under it, and the whole drawn up into the holder by means of both rods. The holder is then attached to the sliding cover of the bath, and slid along the grooves on the top of the bath, pushing the bath cover before it, and, when directly over the opening in the bath, is stopped by means of a catch. By pushing both rods, the plate is lowered into the silver solution without any danger of making a line across the plate by stopping, and rests upon the hook at the end of the solid rod, with its upper corners resting in the grooves in the lower end of the carriage. When excited, it is drawn up again into the carriage and allowed to drain. The aperture at the bottom of the holder is then closed by pushing in the back of the holder, which action also presses the plate into focus against the edge of the carriage. The holder is then slid off the bath, drawing the sliding cover of the bath into its place, transferred to the camera, and exposed in the usual manner.

The developing tray (fig. 2), is constructed with orange-glass sides, double thickness, so as to be absolutely non-actinic, set in a wooden frame, in the same manner as a bath and one side is made so that it can be detached; to this side is attached a bellows-like projection (A), closed at the top by a lid (B). The other side is closed by a door hinged at the bottom. This developing tray must be exactly the width of the plate used, and one inch deeper. In the lower corners of this tray are fastened two soft rubber corners, one inch high, so that from the top of the tray to the top of the corners is exactly the height of the plate used. At the lower right-hand corner is a hard rubber funnel (C) for the purpose of introducing the iron solution into the bath. The top is provided with a sliding watertight cover, exactly similar to that attached to the silver bath.

Fig. 2.



The mode of operating the developing tray is as follows:—After exposure, the holder is taken from the camera, attached to the sliding cover of the tray, slid along the grooves, pushing the cover before it, and when exactly over the aperture, is stopped by a catch. The aperture at the bottom of the holder is then opened, and without lowering either carriage or solid rod, the latter is turned around so as to bring the hook at its end from under the negative plate, which falls into the developing tray, upon the soft rubber corners at the bottom. The holder is then slid off, drawing into its place the sliding cover, which is made water-tight, by turning the knob (D). The position of the plate is then as follows:—It rests with its two lower corners upon the soft rubber corners in the bottom of the developing tray; the back of it is against one side of the orange-glass sides of the tray, and the top is against the top of the tray. The iron solution is then poured into the trough at the bottom of the tray, formed by the two rubber corners, through the funnel (C). The tray is then turned down with a quick motion, so that the solution may flow evenly over the plate, the door at the back thrown down, the door at the top (B) raised, and the action of the development can be as easily watched as in a dark tent, as all the light is reflected light coming through the lower orange glass side of the developing tray upon which the plate rests. As the plate exactly fills the tray, excepting the trough at the bottom, none of the developing solution can flow off from it. When developed, the iron solution is poured out through the funnel, water poured in, and the plate thoroughly washed, by rocking the tray from side to side; when washed, the water is poured out, the front (A) removed, the cover slid off, and the plate removed, ready for intensifying, fixing, or coating with glycerine.

It will be easily seen that in this apparatus there is no mixing of solutions, no part that touches the silver coming in contact with the iron; and after one plate has been exposed, the developing tray is the only part which requires cleaning, and as one side of it is removable, this is very easily accomplished.

This apparatus is very portable, one adapted for half-size, with eighteen plates and the necessary chemicals, going easily into a small travelling bag, leaving room for sundry articles of clothing; and yet the bag measures only fourteen inches long, six inches wide, ten inches high.

This apparatus is the result of a long series of experiments instituted last spring, after the writer had become disgusted with the slowness of dry plates; and he has had two sizes, a 4-4 and a ½-size, in constant use as an amateur since last summer, and has averaged, when using it, eleven negatives out of twelve cleaned plates. One great advantage he has found in using this apparatus is, that from the time the plate is coated with collodion until the developer has flowed over it, it is not exposed to even the weakest light, a result which it is not possible to obtain in a dark tent.

The tripod stand used with this apparatus is in the form of a cane, ¾-inch in diameter, and although, when not in use, it is only the height of an ordinary cane, and exactly resembles it in appearance, it, when in use, can be made five feet high, and is perfectly steady.

PRACTICAL HINTS.

The following hints are selected from a chapter of miscellanies in the *Bulletin Belge*:—

Mounting Proofs — Strelitsky's Method. — This Hungarian invention consists in mounting two proofs, one upon the other. If we clearly understand the description, the process consists in impregnating a proof on thin paper with varnish or spermaceti, until it becomes transparent, and then glueing it on to glass. The second proof, from the same negative, but upon thicker paper, is then mounted very accurately upon the first, and this superposition gives very agreeable effects. It would, doubtless, be better that the two proofs were artistically coloured, according to the effect it is desired to obtain; but this is not essential.

Barley Developer.—Take one pound of Scotch barley, wash it in two or three waters, and then simmer it in a quart of water, over a fire, during several hours; when it becomes quite hot, add from one to two ounces of crystallizable acetic acid: the exact quantity will depend on the season and temperature. Stir the mixture well, and leave it to settle; then filter, and add as much ordinary iron developer as of acetic acid added: no alcohol is required. This solution will keep an indefinite time; it filters rapidly, develops quickly, and flows like oil; it is much more economical than any other. With a very old silver bath, containing ether and alcohol, add for every 150 parts of developer 30 to 40 parts of alcohol.

Schnauss' New Developer.—Although it may appear superfluous to increase the number—already very considerable—of formulæ of this kind, we do not hesitate to announce to amateurs a developer which communicates an extreme sensitiveness and delicacy to negatives. The term new is, perhaps, not strictly correct; for all that is new in it is the substitution of succinic acid for acetic acid. The following is the formula:—

Saturated solution of sulphate of iron ...	4 parts
Solution of succinic acid	4 ,,
Distilled water	16 ,,
Alcohol	1 part.

The proportions are by measure.

The development is as rapid as that with ammoniacal sulphate of iron, but the shadows are better detailed, and the lights more transparent, with extremely delicate half tones.

MAGIC PHOTOGRAPHS.

BY PROFESSOR TOWLER.*

Another photographic plaything is before us, which, from all appearance, will be in great demand for a while. It can be made very amusing for children, and for all others of a more advanced age who are not above being what they have once been, when fictions pleased them more than realities.

A very estimable and intellectual lady, the head of an establishment where our sisters and daughters are washed, taught, and prepared for spheres hereafter, called in the aid of the chemist a few months back to instruct her in the preparation of magic papers or leaves to be used by a little witch or fortune-teller at an evening's entertainment for the benefit of our sick soldiers.

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* *Humphrey's Journal.*

The little sybil whose office it was to superintend this branch of the evening's entertainment was appropriately donned in the habiliments of an enchantress; and her nook was a sylvan haunt constructed in the corner of a room, amidst roots, logs, snakes, and ogres. Fiery eyes were seen flashing scintillations through every avenue amid the over-hanging branches, to give magic zest to the retreat, and to deter intruders. Within this dark abode, at the entrance of a cave, sat the little sybil, who had only to look to lure. And many were the victims of that night, beguiled of their mental composure for months afterwards by the incantatious or spells of the sybil's eyes. Before her was a wicker-basket, wound alternately with green twigs, snakes, and centipedes; and this basket was full of sybilline leaves, small pieces of paper perfectly white and without stain. The sybil sold these papers at the rate of two shillings each, and so great became the sale, that a little Puck had to be generated among the dentiform crevices to assist in the distribution. As soon as the sybilline leaf was paid for, the tiny fingers of the sylph dipped it in a ewer of water, the fluid of incantation. No sooner was this done than there started upon the leaf words distinct and legible, prophetic of the youth's future; and the youth, not like us old codgers, long initiated in the wiles and charms of sirens, was fain to believe in the truth of the prophecy; that there was an appropriateness, a fitness, a probability in the prophetic leaf, the fond creature could not help but believe; hence his sleepless nights and his dreamy days for months after this event.

You would like to know how these magic leaves were prepared?

That is just what we expected.

Two liquids are required in the preparation of sybilline leaves: one is the invisible ink with which the leaves are written before they are deposited in that frightful basket, and the other liquid, when the leaves are immersed in it, colours the invisible ink, and thus makes it quite legible.

Such inks are called sympathetic: there are several of them.

The following two liquids produce by their conjoint action blue letters:—

Dissolve a grain or two of protosulphate of iron (green vitriol, such as you use in your developer) in a drachm of water; and with a perfectly clean pen write with this solution on a piece of paper. When dry, the writing will be invisible. But now immerse the dried leaf in the following solution:—

Ferrocyanide of potassium (yellow prussiate of potassium) ...	1 drachm
Water	1 ounce.

As soon as the paper has been immersed in this solution, take it out, and watch the letters and words, how beautifully they begin to appear of a rich blue colour.

Ink of a Chocolate-brown Colour.—First Solution.

Sulphate of copper	2 grains
Water	1 drachm.

Write with this solution.

The second solution is the same as before; that is, that of the yellow prussiate of potash.

The reader now will be able to comprehend the nature of the magic photographs, which are not *miracles*, nor is their production a recent discovery. But there is much amusement to be derived from their preparation; and we hope, too, that our practical operators will be able to derive some profit from them.

How to Make the Magic Photographs.

Take in the first place an ordinary print (a card-picture, for instance) on albumen paper, beneath the negative in the usual way, and when sufficiently printed, let it be carefully washed in the dark room so as to remove all the free nitrate of silver, &c. Now immerse it in the following solution, also in the dark room:—

Saturated solution bich. of mercury (corrosive sublimate)	1 ounce
Hydrochloric acid...	1 drachm.

The saturated solution is previously prepared by putting into water more bichloride of mercury than it will dissolve by shaking in about twelve hours.

The print will gradually be bleached in this liquid, in the ordinary meaning of the word—that is, it will disappear; but the fact is, the print is still there; its colour alone is changed, a double salt having been formed of mercury and silver, which is white, as many of our readers who have been in the habit of intensifying with a mercurial salt are aware of. As soon as the print has quite disappeared, the paper is thoroughly washed and dried in the dark room; it is also preserved between folds of orange-coloured paper in order to keep it from the action of light, for the surface is still in some measure sensitive to light.

The bleaching of the print—that is, its conversion into a white salt—is effected more quickly by keeping it in motion in the mercurial solution.

As we said before, the print has not been bleached in reality; the substance which originally formed it is still there, together with a new substance, a salt of mercury. But the two salts of silver and mercury may be easily brought out and made visible by several solutions, such as sulphide of ammonium, solution of hydrosulphuric acid; in fact, any of the soluble sulphides, ammonia and hyposulphite of soda. The latter salt is used in preference to the others. Small pieces of blotting-paper, therefore, of the same size as the print, are cut out and steeped in a saturated solution of hyposulphite of soda, and then dried.

The magic photographs are packed, as before stated between folds of orange-coloured paper; the papers dipped in hyposulphite of soda are the developers, and may be packed between two sheets of common writing-paper. The development of the image is effected in the following manner:—Place the albumen paper which contains the whitened print on a pane of glass, print side upwards; on this lay the dry piece of blotting-paper that has been previously dipped in hyposulphite of soda. Moisten the latter thoroughly; then place over it a pane of glass, and upon this a weight to bring the two pieces of paper into intimate contact. In a very short time the picture will appear in all its original detail, and of a sepia tone.

Recent Patents.

PHOTOGRAPHIC ENGRAVING.

BY HENRY AVET.

This invention, another slight modification of the various methods with bichromate and gelatine, resembles, in some details, a process recently patented in America, and styled the "Leggotype," a notice of which will be found on page 175 of the present volume of the Photographic News. The invention only received provisonal specification. It will be noted that there is some ambiguity in the specification, which proceeds as follows:—

This invention relates to the production of printing surfaces and other surfaces by photography. A negative is first prepared on a plate of glass or other solid transparent or translucent material, and on its collodionized or coated side is spread a film of gelatine, gum, or other organic substance, combined with bichromate of potassa, sometimes first forming a border of wax or like agent to retain the solution and define the thickness. The plate is then placed flat to allow the film to dry sufficiently, and is then exposed to the light on the non-collodionized side, or so that the light may act on the organic substance through the glass or other plate (sometimes presenting it so as only to catch the vertical rays. Next, by means of the camera obscura, the portions of the film which the black and half tints have preserved from the action of light are dissolved (when gelatine or gum is used this can be done by hot water). When dry, the subject will appear in relief. If the relief be insufficient, the process may be repeated. Any anti-photogenic shade resulting from the bichromate is removed. The subject being metallized by nitrate of silver or other agent, is then electrotyped, or an impression is sometimes first taken in a plastic material (such as gutta-percha with Venice turpentine and essence of turpentine), and then electrotyped; or it may be coated with metal or otherwise. Sometimes, instead of applying the film in solution, it may be applied in leaf or scales. Leaf gelatine, or other agent in leaf, may be sensitized by immersion in a solution of bichromate of potassa. To produce an artificial grain, a drawing is made in fine white lines on a coloured anti-photogenic background, or vice versâ, preferring to use for the purpose a large frame covered with black cloth, upon which white net is stretched. A photographic negative is made by first photographing the grain and then the object, or vice versâ, reducing as required. The negative is then treated according to the above-described method. A design of the grain may be obtained by making a negative from a reduced drawing in black lines on white ground; it may be used as (a transparent) or applied on another negative with the collodionized surfaces in contact.

ORNAMENTING JAPANNED SURFACES WITH PHOTOGRAPHY.

BY T. FARMER AND F. LEWIS.

The following is a method of transferring collodion positives to japanned surfaces for decorative purposes. The specification is as follows:—

Our invention consists in ornamenting the surfaces of japanned goods and papier mâché goods and other varnished surfaces by applying thereto positive photographic pictures in the manner hereinafter explained.

The essence of our invention consists in removing the film on which the photographic picture is produced from the glass or other surface, and applying it to and fixing it upon the said japanned or other surfaces.

We will describe our invention with reference to the ornamenting of the surfaces of japanned goods by means of collodion photographic pictures produced on glass. We take a positive collodion picture which has been produced in the ordinary way; we prepare a piece of paper or other suitable flexible material by coating it with gelatine; we lay the gelatine surface of the paper upon the collodion picture on the glass, and when it has remained thereon until the gelatine is nearly dry, we remove it, the said gelatine surface bringing with it the positive photographic picture which had been produced on the glass. The photographic picture thus obtained, adhering to the gelatine surface of the paper, is now ready to be transferred to the surface to be ornamented. In order to prepare the japanned surface to receive the said photographic picture, we apply to the said surface a spirit or other varnish. Having varnished the surface, we place the photographic picture attached to the surface of the gelatine upon the prepared surface to be ornamented, and by gently rubbing or pressing the gelatine paper, we make the photographic picture thereon adhere closely to the prepared surface. The gelatine and paper are then removed by means of warm water, leaving the photographic picture on the said japanned surface, the photographic picture being uninjured by the treatment to which it has been subjected. The photographic picture is afterwards secured and protected, and painted if required, and varnished and finished as in ordinary japanned goods.

We wish it to be understood that in practising our invention we employ photographic pictures of the kind called positive pictures, whether the said pictures are positive by reflected or transmitted light. When we employ positive photographs which are positive by reflected light, we make the ground or surface black or of a dark colour, to which the picture is to be transferred. When we employ photographs which are positive by transmitted light, we make the ground or surface white or of a light colour, to which the picture is to be transferred. We have not thought it necessary to describe either the methods by which the positive photographic pictures which we employ are produced, or the processes of preparing the solution of gelatine, or the varnishes which we employ, as the said methods and processes are well known and separately commonly practised, and constitute no part of our invention.

In ornamenting surfaces according to our invention, we use all kinds of positive photographic pictures, such as portraits, groups, statuettes, landscapes, and ornamental designs in general, the said pictures being applied in the manner hereinbefore explained.

Having now described the nature of our invention, and the manner in which the same is to be performed, we wish it to be understood that we do not limit ourselves to the precise details herein described, as the same may be varied without departing from the nature of our invention; but we claim as our invention ornamenting the surfaces of japanned goods, and papier mâché goods, and other varnished surfaces, by applying thereto positive photographic pictures, substantially in the manner hereinbefore described.

MANUFACTURE OF BICHROMATE OF POTASH.

BY JOSEPH M. DENTITH.

This improvement received provisional protection only, and is very vaguely described. The specification is as follows:—

The improvements consist in a new and improved method of producing chromate and bichromate of potash, a chemical production extensively employed in dyeing and printing calico, woollen, or other textile woven fabrics, the improved manufacture and production of which is obtained by the combination and admixture of felspar or other well-known potash-producing rocks with chromate of iron or oxide of chrome in the proportion of about twenty parts of potash-producing rock added to seven parts of chromic ore, and subjecting such materials, when in combination, to a bright red heat (say about one thousand nine hundred Fahrenheit), which will thereby produce a superior and inexpensive potash required for the purpose as hereinbefore described.

DE LA RUE AND CELESTIAL PHOTOGRAPHY.[*]

In pursuing his favourite subject, Mr. De la Rue has successfully taken pictures of Saturn, Jupiter, and Mars, and of some of the fixed stars. The most valuable, however, of Mr. De la Rue's contributions to Astronomical Photography was the designing of the photo-heliograph of the Kew Observatory, and subsequently of the micrometer used for measuring the solar autographs, so as to bring them under the domain of calculation.

Sir John Herschel suggested that it would conduce greatly to a true knowledge of our luminary if a daily photographic record of the sun's surface were obtained. Acting upon this suggestion, and at the request of the Royal Society, Mr. De la Rue designed the Kew heliograph, which was erected at the Kew Observatory of the British Association in 1858, and has since that time been more or less worked.

In 1860, this heliograph was taken to Spain, at the desire of the Royal Society, and was successfully employed by Mr. De la Rue at Rivabellosa, in obtaining a series of pictures of the solar eclipse of July 18, before, during, and after total obscuration.

In the Bakerian lecture, read before the Royal Society on the 10th of April, 1862, the methods used in measuring these photographs are fully set forth, and the results discussed at length.[†]

From an early period several peculiar phenomena have been observed during eclipses of the sun, especially just before and after total obscuration. In 1733, Rydheuius, pastor of Forshem, states, "When the sun was about to lose his light, and also when he was about to recover it, *he emitted rays that undulated like the aurora borealis, and were of a fiery red colour*.[‡] Delisle has recorded an observation made in 1738 of the moon's shadow passing upon a wall at the moment of total obscuration—*tinged with different colours*,[§]—by whom made we are not informed; and in 1842 some French astronomers, according to Arago,[‖] observed similar phenomena to those just described. In 1836, on the occasion of the annular eclipse of May 15, Mr. Baily noticed a very striking appearance, which he thus describes:

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[*] Continued from p. 319.

[†] 'Philosophical Transactions for 1862,' vol. clii., p. 333.

[‡] 'Acta Lit. et Scien. Succ.,' tom. iv., p. 61.

[§] 'Mémoires pour servir à l'Histoire et au Progrès de l'Astronomie.' St. Petersburg, 1738.

[‖] 'Annuaire, 1846,' p. 309

"When the cusps of the sun were about 40° asunder, *a row of lucid points like a string of bright beads*, irregular in size and distance from each other, suddenly formed round that part of the circumference of the moon that was about to enter on the sun's disc." The same phenomenon occurred in a reverse order at the dissolution of the annulus. This phenomenon had been observed previously (but never so perfectly described as it was by Mr. Baily[*]) by Halley in 1715, by Delisle in 1724, by Professor Bayne in 1737, by the Rev. Mr. Irvine in 1748, by Mr. S. Webber in 1791,[†] and some others. Subsequent to Mr. Baily's observations no opportunity has been lost by astronomers; and other and yet more remarkable phenomena have claimed especial attention. By far the most striking, and we may almost say inexplicable, are the red protuberances which appear on the edge of the sun when all the direct radiations are obscured by the body of the moon.

The earliest notice which we have of those red protuberances beyond that of Rydhenius, already spoken of, is to be found in an account of the total eclipse of 1733, by Vassenius, in the 'Philosophical Transactions of the Royal Society.'[‡] Vassenius speaks of them as "some reddish spots which appeared in the lunar atmosphere without the periphery of the moon's disk." These red spots appear to have attracted occasional attention; but it was not until the eclipse of 1842 that any degree of close observation was directed to them. M. Mauvais, who observed this eclipse at Perpignan, described the phenomenon as observed by him. He says, "I cannot give a more exact idea of their aspect than by comparing them to the peaks of the Alps illuminated by the setting sun, and seen afar off."[§] M. Mayotte, an officer of the French Engineers, compared the protuberances, as seen by him, also from Perpignan, to *beautiful sheaves of flames*. Each observer who has written on this eclipse has described the phenomenon as seen from the several points of observation along the line of totality. Mr. Baily, who was at Pavia, wrote of the luminous protuberances as having the appearance of mountains of a prodigious elevation, the colour of the peach blossom nearly representing their aspect.[‖] Mr. Airy was near Turin. He remarks, that "in form they somewhat resembled saw-teeth in the position proper for a circular saw."[¶]

M. Littrow, of Vienna, and M. Otto Struve, have given carefully graphic accounts of these protuberances. They have also been noticed by other astronomers in all parts of the world. Sir John Herschel thus describes them: "Distinct and very conspicuous rose-coloured protuberances were seen to project beyond the dark limb of the moon, likened by some to flames, by others to mountains, but which their enormous magnitude and their faint degree of illumination clearly prove to have been cloudy masses of the most excessive tenuity."[**]

In 1851, Dr. Busch succeeded in obtaining a Daguerreotype of the total eclipse of that year with the Königsberg heliometer. In this Daguerreotype the protuberances were seen, but indifferently defined.

In 1859, Mr. De la Rue commenced making the experiments necessary for securing a favourable photographic result, upon the occurrence of the total eclipse of 1860. The difficulties in the way of this were great. These will be gathered best from Mr. De la Rue's own words: "I made inquiries of those astronomers who had witnessed the eclipse of 1851 respecting the intensity of the light of the corona and red flames as compared with that of the moon, and the relative brightness of one to the other. . . . . The general impression I formed from the information thus derived was, that the light emitted by the corona and red flames taken together was about equal to that of a full moon, less rather than greater; but no one recollected precisely the brightness of the prominences as compared with that of the corona."[††] Numerous experiments were made, and it was rendered evident that the utmost sensibility must be secured in the collodion plates to leave any hope of photographing those "cloudy masses of the most excessive tenuity." The result of those preliminary experiments was that "nitrate of silver baths, prepared in the ordinary way with crystallized nitrate of silver, were taken and were used in depicting the several phases of the eclipse, with the exception of those of totality. In taking the latter pictures, the baths used were made with nitrate of silver which had been fuzed carefully in my own laboratory, and were so extremely sensitive that they would give photographs of the full moon in the focus of my reflector in less than a second of time, while with the usual bath five seconds were barely sufficient to give a picture of similar intensity."[*] Thirty-four cwt. of apparatus, made up in thirty packing-cases, were conveyed in the 'Himalaya,' landed at the port of Bilboa, and thence conveyed to Rivabellosa, a distance of seventy miles, by the ordinary conveyances of the country. Everything was satisfactorily arranged, and "upwards of forty photographs were taken during the eclipse, and a little before and after it, two being taken during the totality, on which are depicted the luminous prominences with a precision as to contour and position impossible of attainment by eye observations." Thus was achieved a most important end; and we have secured a record of some peculiar solar energy, or its effects, which will greatly aid us in determining the physical condition of the solar mass, and its enveloping gaseous spheres. For a full and detailed account of the apparatus used, and of the methods adopted, as well as for a graphic description of the eclipse itself, we must refer our readers to the Bakerian lecture already quoted.

In that paper the methods used in measuring the photographs are also fully set forth, and the results discussed at length. It is there shown, by measurement of the positions of the luminous prominences in the totality of pictures obtained at two epochs, one immediately after the disappearance, and the other just before the re-appearance of the sun, that the angular change of position of the luminous prominences with respect to the moon corresponds to the theory of their fixature to the sun:—That the "flames" change only apparently, not really, by the moon's motion over them—that is, as the moon covers one portion and discloses another—and do not otherwise undergo any alteration; so that when the clock, by which the telescope was moved, was adjusted to the sun's motion, the "red flames" stood still. Moreover, it is therein shown by a comparison of the photographic pictures with the optical observations made by Mr. De la Rue at the same time, that luminous prominences invisible to the human eye are depicted in the photographs; thus pointing out and exemplifying by a new experiment the difference which has been frequently shown to exist between the solar, chemical, and luminous radiations.

A curious question arises from the consideration of the chemical power evidently possessed by these prominences, be they flames or clouds. We never, as we have already stated, under ordinary circumstances, obtain an impressed image of the sun without finding the indications of a protected circle—that is, one which proves a paucity of chemical power—surrounding the photographic disc. Yet, when the light of the solar disc is interrupted by the body of the moon, the radiations proceeding from the edge, or rather, perhaps, from beyond it, have a strong photographic power. What is the cause of this most remarkable difference? The question can only be answered satisfactorily by waiting for the evidence of future experiments. Those prominences become visible to the eye during an eclipse, because the eye is protected by the moon from the intense glare of solar light. They evidently belong to the sun. This was yet further proved by a careful examination of the photographs of the same eclipse obtained by Padre Secchi. The luminous prominences, due allowance being made for parallax, were identical in both, thus proving that no change takes place in the form of the prominences for a period much longer than the duration of a total eclipse. It must be borne in mind that the eclipse occurred at an interval of seven minutes between Rivabellosa, where Mr. De la Rue was stationed, and Desierto de las Palmas, where Padre Secchi was located."[†] Now, why is it that the photographic tablet is impressed by those attenuated images during an eclipse—and even by such of them as do not give light enough to be visible at the period of totality—and that they do not effect the required chemical change upon our sensitive plates when the sun is unobscured? The only reply which we are at present in a position to give is, that the diffused light, when the sun is shining, is sufficiently powerful to overcome the weaker chemical radiations of those solar clouds or flames. If this reply approaches correctness, we have additional evidence confirming the view that the two principles existing in the sun-beam—*light* or luminous power, and *actinism* or chemical power—are not modifications of the same *energy*—to use the accepted term of the day—but rather forces balanced against each other, acting indeed in antagonism. That the luminous rays have the power of entirely subduing the chemical rays has been shown by several experiments by Sir John Herschel[*] and others.

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[*] 'Memoirs of Astronomical Society,' vol. x., p. 7.

[†] Consult 'History of Physical Astronomy,' by Robert Grant, F.R.A.S.

[‡] 'Philosophical Transactions, 1733,' p. 135.

[§] 'Annuaire, 1846,' p. 409.

[‖] 'Memoirs of Astronomical Society,' vol. xv., p. 6.

[¶] Ibid., p. 16.

[**] 'Outlines of Astronomy,' edit. 1850, p. 235.

[††] 'Philosophical Transactions, 1862,' vol. clii., p. 334.

[*] 'Philosophical Transactions, 1862,' vol. clii., p. 334.

[†] "Comparison of Mr. De la Rue's and Padre Secchi's Eclipse Photographs." By Warren De la Rue, F.R.S.—'Proceedings of the Royal Society, vol. xiii., p. 442.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 11*th July*, 1866.

As you have no doubt already learned, from different photographic publications, besides the Committee of Delegates (intended to represent the interests of French photographers at the Universal Exhibition) formed at the close of January last, and of which I have the honour to be a member, two other Committees have been since appointed. This multiplicity of powers has given rise to much hesitation and delay, which has hitherto prevented the publication of the list of exhibitors admitted. At last the affair has been settled, and at the end of the present month the Imperial Commission will put us in possession of the space assigned to us. Our committee, representing the great majority of the exhibitors, will then be able to commence the execution of their fittings and decorations, which will be no trifling matter. Floors have to be laid, and enclosures erected, to separate us from the neighbouring class; a *velum* must be extended over head, to modify the light; decorated entrances must be prepared, as well as partitions to receive the exhibiting frames, &c., &c. Though studying the strictest economy, as faithful agents ought, we were bound to choose the most appropriate arrangements, and to endeavour to secure in all our constructions and embellishments an elegance worthy of the art as well as of the Exhibition itself. I think that we have attained the end desired.

As to the pavilions for the International *atelier* which concern myself personally, their erection will commence immediately, and I believe that they also will be worthy of the honourable position assigned to them in the Park.

I may remark that the whole of the works of the Palace, as well as in the Park around it, are advancing simultaneously. At this moment the Champ de Mars presents a marvellous spectacle. Every morning the visitor can see the immense progress realized during the preceding day. The galleries seem to start up out of the earth as if by magic. The activity is really prodigious, the progress made unexampled.

I have already more than once spoken of the results obtained by M. Marie, the inventor of a photo-lithographic process. They attracted much notice at the last Photographic Exhibition. In the sitting of the French Photographic Society on the 6th inst., M. Marie presented a series of portraits executed by his method, and they were greatly admired. It would be impossible to find in the best proofs taken by the ordinary process a higher degree of delicacy, truth, or vigour. The problem now appears to be solved. The observation has been made that these proofs must have been produced by means of several plates, as in chromo-lithography; but that is of no consequence, provided the result be excellent and practicable.

Another inventor, M. Pinel Béchardière, showed several proofs of engravings on lithographic stones. He uses a positive which he reduces or enlarges at will. These specimens are certainly interesting, but they are far less perfect than those above-mentioned.

M. Anthony submitted to the Society a new model of his apparatus for operating in full daylight, in which he has made several successful modifications, one of them being the introduction of a partition which enables him to take either single views or stereoscopic proofs.

Some specimens of a new filtering paper were sent by M. Talbot Romain, and I send you a small piece of it inclosed. The paper being chemically pure, M. Davanne thinks it might be employed with advantage in the manufacture of gun-cotton. He observed that Mr. Maxwell Lyte, as well as others, preferred paper to cotton, and his most beautiful proofs showed that he is not wrong.

The Parisians have lately had their attention turned to the Catacombs, several hundred persons having visited them within the last few days; and the Municipality have just decided that a monumental chapel shall be erected at the entrance of these immense excavations.

The construction also of huge sewers, to promote the salubrity of this great city, the laying down of water and gas mains, and the diverting of the waters of the Dhuys to supply the capital, have caused great subterranean works, that have made underneath Paris another city full of life and activity. M. Nadar, with the electric and the magnesium lights, has taken views of part of these gigantic works, intended to embellish a book which several gentlemen—engineers and others—are now preparing for publication. Will it not be a strange thing to see photography, the art of the sun, illustrating the pages of a history of subterranean Paris, into which his rays can never penetrate? This is another of those impossibilities realized in our time, which justify that saying of Napoleon, that "the word 'impossible' ought to be erased from the dictionary."

Ernest Lacan.

ENLARGEMENTS.

Sir,—I am sorry again to have to trouble you on a subject that has already been so ably discussed by others, but as your esteemed correspondent, Mr. Samuel Fry, says I entirely mistake the intention and scope of the matter when I say that a special negative is required for enlarging, I am happy to see that he is of my opinion as regards the negative. He says that everything depends on the original negative, and to get a good enlargement we must have a good original. This is still my opinion, and no amount of copying will produce a good negative, although one suitable for enlarging can be made from any negative. I am no advocate for plain life-size photographs, and never would persuade the public to have them; but it does not follow that they cannot be done, neither do I think it useless to attempt them. This is what photographers should attempt, as it is only by aspiring to the highest quality that we succeed in anything.

One advantage the solar camera has over the negative process,—there is no limit to the size. It is as easy to enlarge a carte portrait to eight feet as it is to do it twenty inches. A good negative scarcely loses anything by so doing, as we have all seen by Dr. Monckhoven's solar camera pictures.

It is a great mistake to say persons must sit especially for a negative for the solar camera, any more than the negative process; if from any kind of negative one can be made for one process, it follows that it will do for the other.

I do not write with any antagonistic feeling towards any one or any process. I have always been open to give my advice on the subject of enlargements, and shall be happy still to do so through the medium of your journal.—Yours, &c., Sydney Smyth.

LITHOGRAPHIC BACKGROUNDS TO PHOTOGRAPHS.

Dear Sir,—I notice in a recent News a description of an interesting application of lithography to the backgrounds of photographs. So far as I understand your description, the method proposed will in many cases be frequently a

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[†] "Memoir on the Chemical Action of the Rays of the Solar Spectrum."—'Philosophical Transactions, 1840.'

valuable and effective addition to the photograph; but there is one drawback, I fear, not to its use in photography, but to its worth to the patentee: the same thing, or something very like it, has been done before. Messrs Dixey and Smith, of Brighton, some three years ago patented a similar application, the results of which, so far as I had opportunity to examine them, were exceedingly pleasing. They patented a method of applying a flat tint, by means of lithography, to the background of the finished photograph, and also gave a tooth or grain to the same, upon which the colourist was enabled to finish the picture so as to resemble a painting in coloured crayons, or in a broad style of water-colour painting, which destroyed much of the photographic character of the picture, and produced the effect of an artist's drawing. Possibly Messrs. Southwell Brothers' method may sufficiently differ from this to give their work a distinctive character; but in any case it is desirable to call their attention, and that of your readers, to an existing patent at least kindred in character, and possibly identical in result.—Yours, sir, obediently, V. Blanchard.

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Photographic Notes and Queries.

Revarnishing and Cleaning Negatives.

Sir,—With respect to your leading article in last week's News, I may state that what you have there described as a process for restoring hard-worked negatives has been my mode of dealing with old negatives for the last five years, and has answered extremely well. I have invariably used the ordinary methylated alcohol, and have never lost a negative through the film being dissolved or reduced in any degree. Your remarks as to the nitrate of silver on the paper to some extent impregnating the varnish, is most vividly shown by the brown colour of the first dose of alcohol applied to the poor negative. The time saved in printing from these revarnished negatives is so great, that it doubly repays one for the slight trouble, as well as producing brighter, cleaner, and clearer proofs, and thereby doing justice to the manipulator as well as to the printer.—Yours, &c., George Hooper.

Regent Street.

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Talk in the Studio.

Obituary.—We announce with deep regret the sudden death of Mr. Edward Cater, F.R.S., one of the most accomplished and steadfast friends of photography from its earliest days. A skilled amateur photographer himself, he was deeply interested in all which promoted the welfare of the art, and served on the photographic committee in connection with the International Exhibition of 1862, and for many years on the council of the London Photographic Society. A highly cultivated lover of science, a courteous gentleman, and a most estimable friend, his sudden death has produced a sensation of the most profound sadness in a large circle who knew his worth.

Photo-Crayon Portraits.—Mr. Walter Petty has brought under our attention a style of finishing photographs in crayons after the manner of the well-known vignette crayon portraits of Richmond, by whose name he distinguishes this mode of finishing. A large head only is printed on plain paper, masked, so as to leave a perfectly white background; this is then treated with even wash of a delicate neutral grey. The face is coloured in water colours, and finally finished in crayons. The dress, &c., is also put in over the grey ground with crayons. The result is sketchy and brilliant, retaining the likeness of the photograph, and, at the same time, having much of the effect of a fine artist's drawing.

Aeronautic Photography.—Mr. G. R. Gill, whose "doubles" we have before mentioned as amongst the cleverest we have seen, has sent us an example of a very curious style he is now producing. It is the portrait of a pretty child, apparently suspended in or flying through the air. There is no indication whatever of the mode in which the body is sustained aloft, and the result is both curious and pretty. Another subject, entitled "Bathers," is cleverly managed; the effect of the rippling water, slightly disturbed by the little bathers, is very good.

Female Photographers.—It is stated that a photographic establishment has been opened at 51, Oxford Street, by Mrs. Kemp, under the sanction of the Society for the Employment of Women, with the object of facilitating the entrance of ladies into the profession of photography.

Photo-Sculpture.—The *Educatore Israelita* says:—"A co-religionist at Naples, Signor Giacomo Luzzatte, director of the photography at Pompeii, has invented a most simple, beautiful, and inexpensive process for photo-sculpture, which bids fair to revolutionise this branch of art, and to give it an extraordinary extension and a variety of new useful applications."

The Exhibition of 1867.—We understand that the committee appointed by the Photographic Society for the management of the English photographic department of next year's Exhibition in Paris, will shortly allot the space at their disposal amongst the applicants. There is scarcely one-fifth of the space demanded at the disposal of the committee, who have instructions not merely to limit the allotments, but to reject inferior contributions. A correspondent of a daily contemporary, speaking of the building, says:—"The building for this great world's show is progressing most favourably. More than one-half of the works are completed, and by September it is calculated that the principal part of it will be finished, so that during the winter months the activity with which everything is now being pushed forward will somewhat slacken. It is estimated that by the 1st of September the amount spent upon this undertaking will have reached eleven million francs. The principal entrance and grand vestibule are on the north of the Seine side of the building. Crossing this vestibule, which is about 140 feet in breadth, we enter the principal nave, 100 feet in width and 80 feet in height. This immense gallery goes round the entire building, and is to contain every description of machinery and the various instruments and tools employed in the industrial arts. From this you pass into the outer galleries or naves, till you reach the centre of the building and the walls of the central edifice. Running along these walls there are to be two galleries, one of which is intended for the reception of the works of art of all nations. A little further on is a kind of raised promenade, covered with an elegant tent. The garden is to be adorned with statues, lawns, fountains, and everything capable of relieving the eye fatigued with the sights of the interior. The principal gallery mentioned above is to embrace the whole circumference of the building, but around the outer circle of this there is to be a smaller gallery, about 30 feet broad and 22 feet high, which will present the most picturesque appearance, as it is to contain the provision shops of all nations, set out in their national style, and offering for consumption the national meats and drinks. For example, we shall have the beerhouses and biergärten of Germany, the public-houses and gin palaces of England, Italian caffès, and the restaurants or eating-houses of all nations. Here will be an excellent opportunity for the gourmet to taste the culinary delicacies of the whole world—the birds'-nests soup and stewed puppies of China, a dromedary steak, and a dish of locust fritters."

Photographic Companies.—Several attempts to form companies for the purpose of working photography commercially have been complete failures, a circumstance which may possibly have given rise to the singular mistake made by a monthly contemporary—*The Stationer*—in a series of notices of companies, in which it announces that the *United Association of Photography* died almost at its birth. Whether, as a business speculation, the Association has been as successful as was anticipated, we cannot say; but it has survived its birth, and is still, as may be ascertained in our advertising columns, in active existence. Col. Stuart Wortley has, we understand, recently seceded from the directorate. We quote the remarks of our contemporary:—"The *United Association of Photography* intended to raise £50,000 in the interests of photographic art and human vanity; but the intention, like many of a better kind, has long since found its resting-place in that nether world where the pavement is said to be wholly made of such materials. Perhaps it deserved a better fate. The promoters would unquestionably say that it did; and looking at the aristocratic names which figure on its list of directors, we should imagine that more important personages were of the same opinion. Great things were of course to be accomplished: 'portraits of a very high class' only were to be taken; 'all improvements which could be made practically available to carry to the highest attainable point of perfection every department of photography' were to be introduced; the best artistic talent was to be secured; studios 'combining all possible advantages of light,' with smaller ones, for 'taking instantaneous portraits of children, with a certainty of success,' were to be erected, not only in London, but in some of the 'principal watering places and commercial centres;' and in case the sun should hide himself behind a murky cloud, his reappearance was not to be waited for, but his place was to be instantly supplied by the newly-discovered artificial light. These, however, constitute only a small portion of the wonders that were to be effected. The least wonder of all was, that the company died almost at its birth." *The Stationer* should correct an error like this.

A Hint to Dealers in Photographic Paper.—Our correspondent, "A Practical Man," makes the following suggestions:—"Complaints are continually being made on the annoyance caused by paper being sent on small thin rollers, as there is found to be much trouble in unrolling the same, and getting it to lie in any way flat, to say nothing of the finger markings and creasings on the albumen surface. This might be entirely avoided by dealers sending out their papers up to whole-plate size, in paste-board covers, the different sheets folded according to order, to suit the various sizes required. Papers are more handy, keep better, and float better on the silver solution if sent out in this way than on rollers. One or two dealers adopt this plan, and it would be a move in the right direction if all were to do the same, as it is quite as easy to fold the sheets into carte, quarter, third, half, and whole sizes, as to roll it round a piece of wood, and paste or gum on a direction. The process of pasteboards, folding book-cover fashion, would only want tying with a piece of thin tape or string, putting on stamps according to weight, and all would be complete. The dealer's address could be printed on the cover." He adds a suggestion to photographic dealers, that they should induce some one having influence with the authorities to make an arrangement that small parcels of chemicals should be sent, properly packed, by book post. This would be introducing the general principle of a parcels' post, which might be worth consideration, but could only be done on a general scale, and not for one class of goods only.

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To Correspondents.

Second Volume.—The convergence of upright lines which you describe is due to the tilting of the camera. It must always occur with the most perfect lens where the plane of delineation (the sensitive plate) is not parallel with the object. You must either retire a sufficient distance from the building to take in the whole without tilting the camera, or use a swing-back, which will restore the parallelism between the plate and building when the camera is tilted. 2. A portrait lens of six inches focus will rarely cover perfectly to the edges a plate 6½ by 4¾. 3. Such a lens will doubtless answer for copying either glass or paper positives to the full size of the original. The camera will of course require lengthening.

A New Subscriber.—You will find a method of printing on silk described in the Photographic News of June 1st, and Mr. Cooper's method, by which we have seen very fine results proposed, appears in our number for April 20th.

J. J. Bardwell.—Unfortunately, the work is out of print, and we neither possess nor know where to procure a copy. The works sent to Mr. Carbutt were lent to him to be returned. We authorize you to obtain them from him if you can find facilities for so doing, and when you have used them you can return them to us. We do not know the precise grounds upon which the bromide patent is maintained; but to us it seems utterly inexplicable that so many American photographers yield to the claim, and arrive at the conclusion that it cannot be successfully disputed. It is a familiar fact in this country that bromides were used in collodion from its first introduction by Archer, Dr. Diamond, and others. It was almost inevitable that it should be so, as the superior sensitiveness of bromide of silver to green rays had been demonstrated years before. Bromides had been used with advantage in the paper process, and bromine was indispensable in the Daguerreotype process: what so natural, then, as their use in the collodion process, which succeeded and so closely resembled these processes? In the first collodion we ever prepared—in 1853, we believe—we added a bromide as a matter of course; our experience with the Daguerreotype process suggested its great importance. The first volume of the *Journal of the Photographic Society*, published in 1853, of which there are doubtless copies in America, contains several articles in which the use of bromides in collodion is treated. How a patent applied for in 1853 and obtained in 1854, for a thing in its nature not a novelty, seeing it had been used in other processes of photography for years, can be maintained in the face of these facts, we cannot understand. But the collection and arrangement of legal evidence to these facts may not be very easy, and is the work of a skilful lawyer. It can only be effectually done, in such cases, by combination. Whether there is sufficient cohesive material amongst American photographers to form such a combination we cannot tell. We do not think such a patent could be maintained in this country for a day. The same patent was indeed obtained in this country, but no attempt to enforce it was ever made.

H. H.—You may obtain a view meter of almost any of the dealers; but you may, if you have skill enough, make one of a piece of thin sheet brass, or even of a piece of card, and adapt to your own lenses. A small round aperture should be made in one piece of card or brass, to serve as eye-piece, which is attached at right angles to another piece. At the other end is a piece with a rectangular aperture of the shape and proportions generally used for the picture. This is arranged so as to slide nearer to or further from the eye-piece. A careful experiment must be made as to the distance required between the rectangular aperture representing the picture and the eye-piece, for the amount of subject included by the different lenses you employ, and the distance marked for each. This is a simple contrivance, sufficiently accurate for most purposes, which may be easily made, and can be folded up and carried in the waistcoat pocket. 2. The greasy repellent effect of film which you describe is very often troublesome in hot weather, and may arise from many causes. One of the remedies most easily tried, and often successful, is to immerse the plate in the bath before it is too much set. The reason why the defect is most common in hot weather is, that the rapid evaporation of the ether often causes the film to be too much set before it is immersed in the bath, in which case the aqueous solution permeates the film with difficulty, and causes the greasy effect you describe. When this, as one of the causes, is recognized, it is easy to apply a remedy. Other causes—such as the character of the cotton, the bases associated with the sensitive salts, the proportion of ether, &c., present—will affect the question. You will find the subject fully treated at page 577 of our last volume. Sometimes a change of collodion is the only remedy—rather a serious one when there is a heavy stock on hand; but you must remember that in suggesting a remedy of that kind, we cannot help the inconvenience it causes. We always recommend the simplest remedies for trial first; troublesome or costly remedies should only be tried when simple ones fail.

Enquirer.—It is probable that you will find the fullest details hitherto made known, by procuring the specification of the patent. The inventor has been a little anxious to avoid publishing more details than were necessary.

Stereoscopus.—Considerable latitude is permissible in mounting stereoscopic prints, without destroying the stereoscopic effect; but the best effect is only obtained when the proper conditions are complied with. The difference, if any, should be, that a portion more should be included of the right side of the right half of the slide when mounted, and a portion more of the left half of the left side when mounted. If you close your left eye, you will see a portion more of the right side of the room in which you sit than when you close the right eye. In speaking of the right and left side, we always refer to the mounted picture. 2. The difference in the division between the two halves as produced by the different pairs of negatives arises, we presume, from the extent of field they cover. The lenses with the largest field produce pictures which slightly overlap on the sensitive plate, and so produce a dense line of division between the two pictures; the others, not covering quite so much, leave a space unilluminated, and therefore without deposit, and transparent in the finished negative.

P. A. E.—No detailed description of Mr. Cox's tent has yet appeared. We believe Mr. Rouch was appointed agent. We understand that some particulars as to price, &c., will shortly appear in our advertising columns. We believe that Mr. Edwin Cox, Photographer, Weymouth, is sufficient address.

John Hemming.—The proportions of bichromate and gelatine used in photo-lithography vary with circumstances. The formula given in Col. James's book is stated to be variable, but is given as follows:—Two and a half ounces of bichromate of potash are dissolved in ten ounces of hot water, and added to three ounces of gelatine dissolved in forty ounces of hot water.

George Collins.—The slight metallic marking on the print you enclose might have been produced by many causes; it has the effect of arising from some reduction produced by keeping the sensitive paper some time before fixing, the portion protected from the atmosphere apparently having escaped the reduction and metallic marking. 2. The causes of impure lights in developed prints are various: actinic light having reached the paper at some time between sensitizing and developing; excess of silver without sufficient acid present; or defects in the paper. The use of a chloride in the first preparation of the paper, and sometimes of a trace of citric acid, is conducive to clean lights.

W. L. Noverre.—Thanks for your letter. We shall be glad to hear from you soon.

D. J. O.—Mr. Taylor has used various strengths and proportions with success; but he has not stated the formula in detail which he found best. We will ask him to oblige our readers with further details of what appears to be a very promising printing process.

B. Wyles.—The pictures are good. The tone is warmer than would be preferred by most persons, and a little more brilliancy would be an improvement; but the lighting, modelling, &c., are very good.

B. L. M.—It is scarcely fair to ask us to explain the non-appearance of something promised in other journals; but there is no discrepancy between that fact and the statement in our last, inasmuch as the said non-appearance is not in any way the result of any incapacity to produce the prints in any numbers. Every fresh result we have seen has been an improvement on the last. In our own case we made no definite promise until we received authority to do so, and then that promise was strictly performed. There is no limit to the numbers which can be produced; of our print, Mr. Woodbury produced over 5,000 with his own hands.

St. Fillans.—The same circumstance, as regards the citrate of silver occurred in Mr. Gordon's experience, and he adopted the plan afterwards of using three grains of citric acid to each two grains of nitrate of silver in the solution. When a precipitate of citrate of silver is formed, the solution is robbed of a large proportion of acid, the citric acid being a tribasic salt. Your experience seems to point to this loss of acid in conjunction with prolonged intensifying, as a cause for the fog.

Cornish.—No prints were enclosed in your letter. Any trace of hypo. will spoil the toning bath. 2. You cannot get pictures of different sizes with the same lens, of the same objects, from the same point of view. To get different sizes, you must change your position, advancing or receding as you may require. 3. Landscape lenses are not suitable for portraiture; the required exposure is too long. Your prints have since arrived, and confirm what we have said. You had better throw the toning bath away.

J. H. C.—Thanks. As you would see, the matter had already received attention.

E. Gotthiel.—Thanks.

L. Field.—Thanks. The frame seems ingenious and efficient; we will try it, and report in our next.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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VARIOUS MODES OF RETOUCHING NEGATIVES.

In retouching negatives, taste, judgment, and skill are imperatively necessary, in order to secure a result which shall justify the operation. In this, as in all cases in which artistic skill intervenes to modify or improve the results of photography, it is success alone which can be regarded as the touchstone of legitimacy. Time was when attempts of the kind were regarded as little short of sacrilege. The possession of artistic beauty, it was alleged, could never compensate for the loss of photographic truth. It was overlooked, in urging this argument, that the defects of a photograph often militated against truth just as much as against beauty; that black shadows, deep wrinkles, intensified freckles, &c., the result of bad lighting or under-exposure; white skies, stains, &c., the result of errors in manipulation, were as untrue to nature as they were ugly in art. These arguments are generally obsolete, and most cultivated photographers consider it their duty to obtain the highest pictorial results they can, by simple photography if possible; if not, by bringing to bear such adjuncts as their skill and taste can devise and execute. Mr. Bedford never hesitates to manipulate upon his negative in any manner which may improve the pictorial character of his results. Mr. England carefully masks many of his negatives with skilfully applied patches of tracing paper; and other first-class photographers adopt a similar course.

The retouching of portrait negatives has, however, been comparatively little practised in this country. The occasional strengthening of a high light, or softening of a strongly-marked wrinkle, has been attempted by skilful men; but no systematic attempt has been made to improve the general character of a negative. On the Continent this has been attempted, however, and with considerable success, both in France and Germany. In the latter country the process has received considerable attention, and some exceedingly fine results have been produced. A very charming example, from a retouched negative, by Emil Rabending, was issued a few months ago in our Vienna contemporary, the *Photographische Correspondenz*, consisting of a bust portrait of a lady, in which the face, a little more than an inch long, appeared to have been worked upon throughout, but with such delicacy that it was impossible, with a very strong glass, to distinguish any distinct stippling or hatching, so carefully was the retouching made to blend with the soft continuous gradation of the photograph. A good deal of secresy has generally been supposed to attach to the methods of effecting this retouching, secretiveness in modes of manipulation strongly characterizing many of the Continental photographers. Several articles have, however, recently appeared in the German journals on the subject, and we have had opportunity of conversation with some Continental photographers on the modes employed. A recent article, by Herr Grasshoff, appeared in the *Mittheilungen*, an early translation of which was forwarded for our pages by our friend and collaborateur, Dr. Vogel, and which has been extensively copied into other journals since. A second article from the same pen has appeared in the last number of the same journal, and another article, by the editor, Herr Schrank, recently appeared in the *Correspondenz*. We propose briefly to embody the hints on the subject, derived from our own experience and the various sources to which we have referred, in a brief description of the various modes employed.

We should first premise that in portraiture, especially, a certain kind of negative is best suited for retouching. A little reflection will suggest that it is chiefly in addition of detail, or lights of various degrees, that improvement is possible. Shadows cannot be added or deepened. If the negative be fogged, or lack depth in the shadows, these are defects which cannot be removed by retouching, except relatively by strengthening lights. Attempts have been made to use an etching needle to get touches of deep black; but this can rarely, if ever, be accomplished with any degree of success. Therefore the negative must, above all, be clean and free from fog, and, as a rule, from over-intensification. If the negative be somewhat thin throughout, it may be materially improved; if from imperfection in the lighting, or from slight under-exposure, the shadows be heavy and wanting in detail; if high lights or half lights be insufficiently pronounced; or if wrinkles or freckles be exaggerated —all these defects in the portrait may be ameliorated or removed in greater or less degree, according to the skill of the manipulator. In landscape, improvements analogous in character can be made, and clouds added and rendered more definite when insufficiently indicated.

There are a good many methods practised, but these may be classified under three distinct heads: the use of a lead pencil or pastel; the use of water colours; and the use of colours with a varnish medium.

Whatever method be employed, it is necessary to obtain a small desk-easel with frame, on which to rest the negative. A piece of looking-glass or white paper should be placed at right angles, so as to reflect sufficient light through the negative to enable the manipulator to see the exact opacity or printing value of each touch he applies. It is also desirable to work with a trial print from the negative at hand, for constant reference, as it will be much easier to ascertain what is deficient from a reference to the print than by examining the negative itself. As a rule, the negative should be well varnished before attempting to retouch it, although there are departures from this plan which we shall describe in due course.

Retouching with pencil or pastel.—This method was described in general terms in Herr Grasshoff's article a little time ago. Since that appeared we have made some experiments, with different materials, with very satisfactory results. For portrait negatives this method is the safest, simplest, and easiest mode of attempting to improve the picture. The especial advantage of this method over water colours arises out of the readiness with which a touch of even intensity can be applied, and the facility of softening or blending the touches. Water-colours are apt to dry with a sharply-defined edge, and it is difficult to soften them on the varnished surface; they are apt to work up and become curdy, with much manipulation; all of which difficulties are absent when the pencil is used. After trying several pencils, we prefer the BB of Newman, Soho Square, which gives a clean, soft, dark grey touch, biting well on the varnished surface. The BBB may sometimes be used, but we prefer the former. We should remark here, that it is imperative that the negative have a good coating of a hard, firm varnish. If the pencil be too hard, there is a possibility of scratching the varnish; but with that we have mentioned no such danger exists. If it be too soft, the point breaks, and the line is blurred and jagged. Those familiar with drawing with black lead pencil know that it is possible to obtain, without definite hatching or stippling, a soft mezzotint-like gradation. It is this quality which makes the lead pencil useful here, for although the varnished surface of the negative does not present a tooth like drawing paper, yet, by skilful application and painstaking, a very delicate result can be obtained, and the markings applied can be blended or softened with a leather or paper stump. For broader touches, adhering more perfectly, and more easily softened with the stump, lithographic chalk may be used, the touch from which is blacker and more opaque. As many of our readers may not readily be able to obtain lithographic chalk, we may make a suggestion for a substitute, which is, in point of fact, nearly the same article, and which is, we believe, very commonly accessible; it is also an adjunct which, in company with the puff and powder box, we have seen in some photographic studios, as well as in theatrical dressing rooms; we refer to what is sold by the perfumer as an "eye-brow pencil," a kind of black pastel, which, when applied to the varnished surface of the negative, bites readily with a firm, broad touch, which may be easily softened or graduated with the stump. This will be found essentially valuable for putting in clouds on landscape negatives where the sky is sufficiently thin to print a slight tint, the peculiar touch possible with this chalk being peculiarly suited to the rendering of clouds where the operator has any skill in such work, and may occasionally be found useful in portraiture.

The amount of opacity to light in the touches of the black-lead pencil is very slight, so that it is not easy to alter the negative to any serious extent, and so to spoil it. Applied to weak lights, it is sufficient to give an increased intensity: applied to detail in a deep shadow, seen by reflected light in the negative, but quite buried in the print, it will produce sufficient additional intensity to give the detail printing value, and so materially improve the picture. A dark shadow under the eye, or under the chin, &c., which gives a heavy effect to the face, may be carefully hatched over, the lines then being softened and blended with the stump, the effect of which will be to remove almost entirely the sombre effect before manifest. Reflected lights gain especially by this treatment, being strengthened if present, or if absent altogether, put in with judicious care, giving an effect of light and transparency to the whole face. The light down the nose, the half-lights on the eye-lid and in the shadow under the eye, may be strengthened with remarkably good effect. A skin of coarse texture, or much freckled, may with advantage be hatched over very freely, and the coarse effect materially softened. The lights, and especially the half-lights on the hair, may be much improved. In all this it is scarcely needful to say, some skill in manipulation will be necessary, and those who know something of the use of the pencil for producing pictures will be most likely to use it well in improving the negative. In hatching, the lines should follow the contours of the features, and the lines may be very delicate and close together without the risk attendant on attempting the same result with water colours.

Touches with a lead pencil will not readily wear off, and there is no necessity for varnishing over them, a practice which would often, by dissolving the first coat of varnish, disturb the retouching. The additions made with the oil pastel or lithographic chalk are more easily removed, and if it be desired to protect them, a coating of dilute albumen may be applied.

We must defer details of other processes until our next.

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ANOTHER MODIFICATION OF THE CARBON PROCESS.

Mr. Blair, of Perth, who was one of the earliest experimentalists to recognise the true principle upon which half-tone in carbon printing was attainable, has recently been making experiments in the preparation of a translucent paper for various photographic purposes. In a recent communication to a contemporary, he proposes to employ it in carbon printing. The paper is made transparent by treatment with copal varnish. After drying, it is treated with gelatine, bichromate, and carbon, and exposed with the paper side next the negative, so as to permit the washing away at the opposite side, thus securing half-tone. This, it will be seen, is but a modification, with an improved material, of the plan he originally suggested, of employing waxed paper for supporting the gelatine and carbon, and which was abandoned because of, amongst other objections, the impossibility of getting pure lights on paper rendered transparent by wax, varnish, &c. Mr. Blair now proposes to combine with this process Mr. Swan's method of transferring. The translucent paper is to be coated with india-rubber before applying the bichromated gelatine and carbon; and after the print is developed, it is to be mounted on white paper, and when dry, the translucent paper, attached by india-rubber, is to be removed as in Mr. Swan's transfer process. For commercial carbon printing, Mr. Swan's process throughout is much simpler and more efficient; but for the amateur experimentalist this plan may present some advantages. Mr. Blair also proposes some other modifications in detail, not sufficiently important to describe here.

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PHOTOGRAPHING A VOLCANO.

Amongst the most interesting of the contributions at the exhibition soirée of the Photographic Society were some cabinet pictures, by Mr. Moens, of recent eruptions of Etna, taken so near the spot that the tripod had to be more than once hastily removed to escape the flow of the burning lava. The *Cornhill Magazine* for the present month gives some interesting details of an attempt to photograph another volcano, the eruption of which has recently excited much interest amongst geologists.

One, of a group of volcanic islands in the Grecian Archipelago, now known as Santorin, mentioned by Pliny as Thera, records of an eruption in which we have before the Christian era, is the scene of the recent convulsion. In the Gulf of Santorin is a group of three small islands or lava heaps, known as Palaio-Kaimeni, Nea-Kaimeni, and Micra-Kaimeni. The word Kaimeni means burnt island, and the prefixes describe each burnt island as old, new, or little. At the latter end of last January, earthquakes were felt, the water of the gulf was agitated, and a small depression was noticed to take place on part of the Nea-Kaimeni, or new burnt island, which rose in 1707. On the night of the 30th, red flame was seen issuing from the sea, the waters of which on the following morning were seen to be red. The submarine disturbances continued, rumbling noises were heard, a huge fissure divided a promontory of this island from the rest, pestiferous gases were emitted, poisoning the fish and driving away the sea fowl. More flames, more sinking of land for a few days, and then, after the throes of travail, a new island was born. Steadily rising for a few days, it gradually ascended one hundred and fifty feet out of the sea, having a length of three times its height, its breadth being rather less than half its length. After a few more days a second island was born, its advent being attended by similar convulsions to those which heralded the first. The two islands have been named George I., and Aphroessa.

In the account of the photographic operations on these volcanic islands, we have but meagre information as to the method used, beyond the fact that although the wet process was employed, dry plates were tried in part of the operation, a circumstance to which some amusingly annoying incidents were due. We proceed to quote the photographer's account of his labours. The Yacht *Albanian* having passed to the windward of the volcano, and come to anchor upon a rocky shore which was once a subaqueous volcano, he says:—

> The ancient and unconquerable fire was in excellent order; at almost regular intervals one heard the roar, dull and heavy, of Aphroessa, and the rush and shriek of the masculine-named crater; and the great columns of smoke, pitchy or snowy, with nearly exact alternation, climbed up into the still air with extraordinary swiftness. I pitched my tent and got my quickest objective to bear on the phenomenon, in hopes to catch some of its graver manifestations, stood all ready with my hand on the shutter until my plate was in danger of spoiling, and then took what came, developed, and got ready again, &c., &c. But nothing came beyond these regular jets of gases, sometimes small in quantity, and at times gushing out like a huge mushroom, spreading, growing, vanishing away. Then a few minutes' silence, another shriek, followed by another rush of steam and smoke, and so on, until the light waxed faint and useless for photographic purposes, when I packed tent, and we left for the yacht, taking the route nearest the volcano which the fears of the sailors permitted. These fears were droll. They were not of the stones or of the sulphurous air, but of the hot water and the acids in it—of the former's melting all the pitch out of the seams of the boat, and scalding them to death, or of the latter's eating all the copper nails up, and letting us dissolve in the corrosive element. One of the sailors kept trying the water with his hand, and the moment it was found to be warm enough for a warm bath, round they pulled out to a safer distance, and nothing would induce them to go nearer.
>
> We loitered along, and it was past sunset ere we came under the lee of the volcano, which now began to show its flames from both craters: not a generous fire, but little flickering flames lapping out of the crevices of the summits from incandescent interiors, like great packed-down coal fires. The smoke of Aphroessa, as it came between us and the sunset sky, was of a beautiful golden brown, like thin bitumen spread on glass, and the cratress "mingled her flames with twilight," where golden, crimson, and purple tints were gradually following the sun down the western sky with every promise of a pleasant morrow.
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> All night long the rumbling and roaring awaked us at intervals, and brought us up to look at the fires. The red light illuminated the smoke of Aphroessa, and the flitting, coming-and-going masses of white vapour of George 1er, but only suggested the more strongly a forge. The whole thing looked so purely like a colossal smithy, that the absence of the hammer-wielders was more noticeable than the presence of anything which was.

The apprehensions of danger were not without good foundation, for, as we learn from another source, a small trading vessel in the gulf was set on fire, its captain killed, and crew only saved by swimming, three weeks after the first commencement of the eruptions. The bath being *hors de combat*, dry plates were brought into requisition during a circuit of the Neo-Kaïmene. Our photographer adds:—

> My day's record would not be complete did I omit to say that, when I came to develop my plates at night, I found that the curiosity of the men in the boat had given me another illustration of the vexations which dry-plate workers are subject to. One of my double-plate holders had been opened, and both plates bore the marks of fingers on the collodion. I was divided between the desire to punish their impudence, and to laugh at the disappointment they must have experienced in finding nothing but a plain piece of glass, when they expected to find pictures ready made; but it is needless to say that the former desire was the strongest by far.

By means of the dry plates, views were subsequently obtained from the summit or crater of this island of the new births, still in a state of convulsion. The writer says:—

> The following day I took some dry plates and the pluckiest man of the crew, and mounted upon Neo-Kaïmene. From this point the spectacle is magnificent, and the revelation complete. There seems to be no proper crater, but a mass of broken rock, from the fissures of which issue jets of steam or smoke from one or the other crater. From all around columns of steam arise without any sound, or at least none perceptible in the roar of George 1er, which was at times almost stunning. The great mass of steam seemed to come from an opening half-way between the two craters, and out of the midst of this I saw a little fountain of black sand spurting up at short intervals above the white chaos. But his Majesty was the chief point of interest. At intervals we could hear, beginning far down in the bowels of the earth, a whistle precisely like that of a locomotive, only of Titanic force, which, rising and growing stronger, came shrieking out of the crater, followed by a roar like that of an immense high-pressure boiler letting off steam. This was accompanied by a jet of hot air, through which I could see clearly but tremulously, as one always sees through hot air; then came a rush of steam, and at long intervals the ash-coloured smoke. The sound during the emission of the steam was so loud that we could not hear each other's voices even from near. Flames we saw not in the daylight, but all over the hillock arose little jets of smoke or steam, and over a large portion of the surface the stones were covered with sulphur like a gilding.

The views taken, plates used up, and some specimens obtained of crystallized sulphur, and of some brilliant lichens which, notwithstanding the proximity of the burning rocks and pestiferous air, were growing luxuriantly, he returned to find that his attendant had retreated to the yacht, and left him to carry, in the broiling sun, the whole of his photographic traps and newly-gathered specimens himself. In this dilemma, even on an extinct volcano, a bottle of Bass's ale, which was provided amongst other necessary solutions in his tent, was found restorative and consolatory; and resting in a little chapel which had suffered severely from the flying stones amid the completest scene of desolation; no green or living thing near, the sea heaving and steaming like a cauldron, a black glacier of volcanic mud moving slowly on, with ever and anon a mass of rock falling down its slope, he thought of Pompeii and its destruction many centuries ago.

"And what kind of pictures did he obtain from the negatives?"

That is just the point which our photographer leaves unexplained.

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PHOTOGRAPHY AND THE KALEIDOSCOPE.

About a couple of years ago, a writer in an excellent transatlantic contemporary, the *Scientific American*, remarked, "Let the photographer once combine the kaleidoscope with the camera, and then see with what ease and rapidity he can produce the most charming designs for dress goods, tapestry, oil-cloth, wall-paper, and numerous other purposes. Such a thing is possible." Almost at the same moment that the American writer stated this, M. l'Abbé Laborde brought under the attention of the French Photographic Society a method which he had adopted to effect the preservation by photography of the changeful designs of the kaleidoscope. On another page, Mr. Woodbury describes a method he has adopted for the same purpose, the fact that any attempt of the same kind had been made not having come under his notice. As a means of preserving patterns for a variety of decorative purposes, this application of photography is deserving of attention, and it may be interesting here to quote from the communication of M. l'Abbé Laborde on the subject. It is worthy of remark, that the method of throwing the designs of the kaleidoscope on a screen by the aid of the magic lantern has since been adopted and exhibited at the Polytechnic Institution:—

> The variety of designs presented by a kaleidoscope, when turned round, is familiarly known to every one, yet we are often surprised at the appearance of very curious and unexpected forms which we see disappear with regret.
>
> I have endeavoured to represent them by photography, and the means I employ are as follows. I do not give them as excellent in every point, for I have only turned to account the objects I had at my disposal. I employed a quarter-plate camera with its lens. In the groove of the frame, a thick board was fixed with a hole in the middle, into which the kaleidoscope was introduced; the small aperture through which the images are viewed was in the interior of the camera, and the axis of the instrument placed exactly on the prolongation of the axis of the objective; this latter is inserted in the ring in the front of a camera of long focus, and fixed in that position. The whole is then placed on an inclined plane, so that the light from the sky illuminates directly the objects reflected in the mirrors of the kaleidoscope. Instead of turning the instrument to produce the different arrangements, it is easier to apply some plain glasses upon which fanciful objects have been previously fastened. The regular figures which result are depicted on the ground glass of the camera of long focus, and the images are focussed direct without being reflected; this portion is naturally more lighted than the others. It requires several minutes of exposure to obtain a picture on the collodioned plate. We cannot focus the portions of the image which are several times reflected, for they appear in the objective as if they came from greater distances, they lack distinctness, and they also exhibit the defect of planitude in the mirrors.
>
> Notwithstanding these imperfections, I believe I have attained the aim I proposed to myself, which is, to place before the eyes of those who are occupied with stained glass, paper hangings, and other kinds of ornamentation, very varied patterns, which photography can supply by the hundred.
>
> I cannot pass over in silence another application of this instrument, although it is in some measure foreign to photography. On the surface of a disc of glass, I glue a host of flat objects, such as paper patterns, small leaves, mosses, lichens, &c., and place them as near as possible to the external end of the kaleidoscope; and, by a mechanism which it is unnecessary to describe, I make the disc turn slowly, and thus present them successively to the inclined mirrors; we then perceive a series of changing figures depicted upon the ground glass, among which we can select those best suited to be fixed by photography.
>
> In a room completely darkened, we can project the images upon a stretched canvas, which will admit of their being seen by many persons at the same time. We must then bring the kaleidoscope nearer to the objective, in order to increase the dimensions and distance of the images, and illuminate the disc by a strong light; in a word, it is a magic lantern, in which we replace the painted slides by a kaleidoscope. If, instead of objects glued upon the glass, we apply various tints mingled, and thrown haphazard upon the surface of the disc, the figures receive the colours, and in their unexpected evolutions are very pleasing to the sight.

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EXAMINATION OF THE KEEPING PROPERTIES OF PLATES PREPARED BY MR. GORDON'S ALBUMEN PROCESS, ETC.

BY ALFRED KEENE.

Having just completed the exposure and development of the last of a few plates prepared to test the keeping qualities of Mr. Gordon's process, I forward particulars, the subject being one of great importance to dry plate photographers, and respecting which many enquiries are being made.

On the 4th of June I prepared four plates by Mr. Gordon's process (Photographic News, p. 206), and four by my own (p. 209).

On the 13th, one of each was exposed, and on the same day developed with plain pyro, and intensified with pyro and acid silver solution: both were quite free from fog or decomposition of any kind.

On the 5th of the present month, *two* of each were exposed, and *one* of each developed as above: the Gordon process, one was fogged, though not to a great extent; my own was free from fog. The other of Mr. Gordon's was developed with a four-grain pyro solution, to four drachms of which two or three drops of the acid silver solution were added in the first instance, and the quantity increased as the picture developed and required intensifying; this was quite free from fog or signs of decomposition. The other of my own was developed with alkaline pyro, &c., and was also quite free from fog, &c.

On the 10th, the two remaining plates were exposed and developed; the Gordon process, one with plain pyro, and my own with *alkaline* pyro. The former quickly fogged, and showed the foxy brown tinge of general decomposition; the latter was free from fog or any indication of decomposition.

Wishing to ascertain the effect of the plain pyro on the Gordon process plates at *different temperatures*, to discover whether the fog was due to the excessive energy of the plain pyro alone, at a high temperature, or to the influence of the high temperature on the sensitized film as well, I prepared four plates by that process on the evening of the 9th, and exposed three of them on the morning of the 10th. No. 1 was developed with plain pyro, the temperature of which, as well as that of the plate, was reduced to about 60° Fahr.; No. 2, also with plain pyro, at a temperature of about 100° Fahr.; No. 3, pyro, same temperature as No. 2, but containing, in the first instance, the minimum quantity of acid nitrate of silver solution before mentioned, viz., about two drops to four drachms; and No. 4, which was not exposed, was treated the same as No. 2. The results were, No. 1 slightly fogged; No. 2 considerably; No. 3 quite free; and No. 4 fogged. It will be seen the temperature of the developer largely, though not entirely, influences the result.

The conclusions to be drawn appear to be that plates prepared by Mr. Gordon's process will not bear the action of the plain pyro developer during the high temperature of summer, but require the addition to it of a minimum quantity of the acid silver solution, and when so developed may be relied upon for three or four weeks; and that those prepared by my process show no symptom of decomposition under the action of plain pyro, alkaline ditto, or ordinary acid pyro and silver, after being kept five weeks. As far as keeping properties only are concerned, the latter have decidedly the advantage; but the superior sensitiveness of the former, and their more rapid development, claim for them preferential consideration.

The relative sensitiveness of these, and also of plates prepared with bromized collodion only (p. 231 of the News), is as follows:—The bromized collodion process requires about the same exposure as the wet; the Gordon ditto, plain pyro developer, about double; the same, with slightly acid pyro, about treble; and my own, with alkaline pyro, also about treble.

My investigations induce me to recommend, for very rapid dry purposes, where the operator is moderately skilful, the bromized collodion process (p. 231); for general work, Mr. Gordon's process, with plain pyro developer during spring and winter; and the same, with slightly acid pyro developer, during summer; and for lengthened tours, requiring long keeping, my process (p. 209).

I shall be glad to know the experience of others on the subject. It is one respecting which no doubt should be allowed to remain, for nothing can be more vexatious than to find, upon returning from a summer excursion, many or all the plates more or less injured by decomposition.

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KALEIDOSCOPIC PHOTOGRAPHY.

BY WALTER B. WOODBURY.

Among the many applications to which photography has been put, I think there is one that has been overlooked; that is, the fixing of the beautiful images produced in the kaleidoscope. This may be accomplished by photography in several different ways, and the results may prove useful for pattern designs and other purposes. I will proceed to describe how this may be done. The simplest way is to photograph the object to be produced kaleidoscopically through the kaleidoscope, and thus obtain a negative of the image and its many reflections; but this method has the drawback of each reflection being weaker as it is reflected more and more. By adopting another method, this difficulty is overcome, and, though rather more troublesome, gives a finer result.

The negative of the object should be taken on a small piece of mica, as it has to be printed from on both sides, as in the design formed in the kaleidoscope each segment differs from the one next it, being reversed.

Take a piece of thin black paper, and having drawn a circle on it, divide it into 8, 12, 16, or as many equal segments as required; then cut out one of these segments, and mount the talc negative with a little gum to the opening. The appearance of the circle will be as in fig. 1. The notches at each division are for the purpose of allowing the lines on the sensitized paper to be seen and registered. Now take a piece of sensitized paper and mark with the compasses in the same manner, but merely at the edges, as in fig. 2.

Fig' 1.

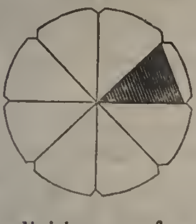
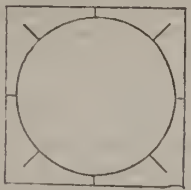


Fig. 2.



Now take a piece of board, covered with flannel, and lay the sensitized paper on it, and place the disc, holding the negative, over it, putting a pin through the two centres. The lines on the sensitized paper are then brought to correspond with the notches in the disc, and a piece of glass being laid over the one half, the whole may be held together by two American clothes' pegs, and the printing commenced. It may be easily examined during printing, and when sufficiently exposed, the disc must be turned round, until the next segment but one corresponds with the negative, and so on until the four are done; the pin must then be taken out, and the disc reversed, and the alternate spaces printed on.

The result will be a pretty kaleidoscopic picture, and which may be varied considerably from the same negative, by altering its position in the opening; a group of flowers, or single flower, a bit of moulding—in fact, almost anything—will produce a beautiful design. By copying subjects in line, and by some of the many photo-engraving processes, I have no doubt that these designs might be transferred to copper rollers, and used for calico or other printing.

* * *

THE STABILITY OF PYROXYLINE.

We recently referred to a most interesting lecture to which we listened at the Royal Institution, chiefly devoted to the subject of gun-cotton, a subject upon which the lecturer, Professor Abel, F.R.S., of the War Department, was peculiarly entitled to speak with authority. We make some extracts from the lecture, which appears in the *Chemical News*, which will interest our readers, as especially relating to the stability of gun-cotton. After describing the constitution of gun-cotton proper—which is insoluble—and the distinction between it and the soluble samples, he speaks of an occasional impurity, of which about 0·5 per cent. is generally present in the ordinary manufacture of gun-cotton. This impurity, he states, consists "of matter soluble in alcohol alone, and possessed of acid characters, which is evidently produced by the action of nitric acid upon such small quantities of resinous or other matters foreign to pure cellulose as are not completely removed from the cotton fibre by the purification which it receives. There appears good reason to believe that this impurity in gun-cotton is of comparatively unstable character, and that the great proneness to spontaneous decomposition which has been observed by Pelouze and Maury, De Luca, and others, in some specimens of gun-cotton, is to be ascribed in great measure to the existence in those specimens of comparatively large proportions of those unstable by-products." He then proceeds to describe the results of various tests of stability which have been applied:—

Very extensive experiments are in progress at Woolwich, with the view of examining fully into the extent of liability to change of gun-cotton when preserved in store, or exposed for prolonged periods to light and to degrees of heat ranging between the ordinary atmospheric temperatures and that of boiling water. The results hitherto arrived at, though they have shown that, under severe conditions, gun-cotton is liable to decompose, have not confirmed the conclusions arrived at by the French chemists with regard to the great instability of the material. Thus De Luca states that all specimens exposed by him to sunlight decomposed either on the first day or within a few days. But at Woolwich no single instance of such rapid decomposition of gun-cotton, made by the present process, has been noticed. A very gradual and slight development of gas occurs after a time when the substance is exposed to sunlight; but the quantity which has been collected from specimens exposed at Woolwich to direct day and sunlight for two years and a half is very small, and the gun-cotton has, in all instances, preserved its original appearance. Pelouze and Maury state that gun-cotton always decomposes perfectly within a few days, by exposure to temperatures of 55°—60° C. (130°—140° F.), and they lay great stress upon the explosion of a specimen directly it was introduced into a vessel heated to 47° C. (116·6° F.). But at Woolwich a specimen of ordinary product which has been exposed now for twelve months to 65° C. (150° F.) has evolved only a small quantity of gas, and retains its original appearance perfectly. Several specimens, after having been exposed for some hours to a temperature of 90° C. (194° F.), during which period some nitrous vapours were in all instances evolved, have since been exposed to light in closed vessels for about twenty months, and still retain their original appearance and explosive characters. Several large ammunition cases, closely packed with gun-cotton, have been preserved for six months in a chamber, the temperature of which was maintained for three months at 49° C. (120° F.), and afterwards at 54°—55° C. (130° F.), arrangements having been made for periodically registering the temperature within the boxes, which were kept closed. In no instance has the latter temperature risen to an extent to indicate serious chemical change; *i. e.*, it has always been below the temperature of the air in the chamber. These few examples of results already obtained are given to show that the behaviour of gun-cotton manufactured in England by Von Lenk's process does not, as yet, at all justify the condemnation which the material has recently received in France.

One most important point in connection with the preservation of gun-cotton appears to have been lost sight of by the French experimenters. The material may be most perfectly preserved, apparently for any period, either by immersion in water, or, still more simply, by being impregnated with just sufficient moisture to render it perfectly uninflammable. In this condition, gun-cotton is much safer than gunpowder can be rendered, even by mixture with very large proportions of incombustible materials. It may be transported with quite as much safety as the unconverted cotton; indeed, it appears to be very much less prone to gradual decay, if preserved for very long periods in a damp condition, than cotton, or other vegetable substances. Many specimens of gun-cotton, preserved for several months in a very damp chamber, together with paper, cotton fabrics, and wood, retained their strength of fibre and all their original properties, and had no signs even of mildew upon them, while the paper fabrics in immediate contact with them had completely rotted away, and the wood was covered with fungi.

Although these experiments refer especially to the stability of gun-cotton proper, they go far to negative the conclusions as to the probable instability of collodion films, derived from the experiments of Pelouze and De Luca.

NEW SENSITIVE SUBSTANCE FOR PHOTOGRAPHIC ENGRAVING.

BY M. L'ABBE LABORDE.

[In the course of some researches in the history of carbon printing, we find that the discovery which led to the production of half-tone in carbon printing, accredited at one time to M. Fargier, at another to Mr. Blair, at another to Mr. Burnett, was really due to M. l'Abbe Laborde, who, in a paper on the use of linseed oil for the purpose of securing a sensitive surface in engraving, read in July 1858, before the French Society, first pointed out that the action of light commenced at the outer surface of the film, and penetrated to different depths according to the intensity of the light, or rather, to the degrees of translucency in the negative. This statement will be found in the last paragraph of the following article, which, as it contains many valuable hints on an interesting subject, and has never appeared in our columns, we reproduce entire.—Ed.]

This new substance is linseed oil, rendered siccative (or drying) by oxide of lead. I had read in the *Annales de Chemie et de Physique* the essay by M. Chevreul on oil painting; but among the causes which contribute to the drying of the siccative oil, which this eminent chemist has studied with so much care, I saw no mention made of the action of light. I came to the conclusion that this action had not yet been noticed, and yet it is so decisive that I have made it the basis of a process of photographic engraving.

This process is at present a mere essay in my hands; but the fact upon which it is based may interest the painter in oil, and become the starting point of a good process of engraving. I believe it to be my duty to make it known.

The most simple means of making the property evident consists in dissolving litharged linseed oil in ether, and spreading the solution upon a glass plate. I shall point out how the proportions of linseed oil and ether to be employed may be ascertained. After allowing the plate to dry, a stencil plate is applied to the sensitive surface, which is exposed to the sun's rays. At the end of five minutes the stencil plate may be removed, and its pattern becomes visible upon breathing upon the impressed surface. If the exposure be prolonged, the pattern becomes more and more visible, and it can be brought out and rendered permanent by covering its surface with lampblack, spread gently with a tuft of cotton. The non-impressed parts remain slightly sticky, and retain the lampblack, which passes more readily over those portions hardened by light.

The following is the method to be pursued in a more regular operation:—It is necessary first to determine the proportions of ether and oil to be spread upon the plate; and as these proportions depend somewhat upon the consistency of the oil, which it is difficult to appreciate, we must have recourse to relative weights or volumes. The following observation has served me as a guide:—If the ether be too abundant, the liquid runs off the plate, dries promptly without much changing its appearance, and leaves a partly shining film, slightly granulated, as if the ether had contained an insoluble substance. If, on the contrary, the oil is in too great proportion, the liquid spreads less rapidly. At the moment when the ether evaporates, the film exhibits a *mat* white tint, which quickly disappears, and leaves a shining appearance, which can scarcely be distinguished from the glass, and to which the fingers adhere upon the slightest contact. The right condition is between these two limits. First, we select a pure litharged linseed oil, free from admixture with any other oil, and presenting the consistency of honey, which it acquires by remaining a long time in a loosely-corked bottle; from fifteen to twenty times its volume of ether is added, and it is then poured on to a clean glass plate. We may immediately recognize, by the characteristics described above, to which the eye becomes quickly accustomed, whether the mixture contains too much or too little ether. If the proportion of oil appears too great, ether is added, little by little, until appearances indicate that it is in too great a quantity; by then adding a very little oil, the film in drying again exhibits that *mat* and fugitive tint before described, then a shining surface, over which the fingers may be lightly passed without adherence. In order to give more firmness to the sensitive film, the glass plate is placed in a dark room, and kept there several hours before being exposed. At the proper time, it is placed under a very transparent negative, avoiding pressing the glass plates too closely together, for the heat of the sun often softens the sensitive film, and causes the plates to adhere in certain places, to the great injury of the picture. I generally avoid this inconvenience by placing a piece of paper between the two glass plates, round the edges; a thin film of air is thus imprisoned, which is very useful to the success of the operation; but then the printing frame must be placed at the bottom of a box, to avoid all lateral light, which injures the sharpness of the picture.

The exposure to the sun must continue at least half an hour. The parts which experience the action of the light are become insoluble in ether, and it is only necessary to pour some several times over the impressed film to bring out the image.

In treating a metallic surface in this manner, we can afterwards attack the bared portions by an acid, and obtain a deep "biting," for the linseed oil forms reserves which perfectly protect the parts they cover, especially when, after having developed the picture by ether, we leave the reserves to be acted upon by time and light. Metallic surfaces require much longer exposure. In fact, I have frequently remarked the influence of surfaces upon the sensitive films with which they are covered, and were I to classify the substances I have specially observed, I should place them in the following order, commencing with the best:—Glass, silver, copper, iron, zinc; from which it may be concluded that the subjacent surface is much more favourable to the action of light, in proportion as it is less oxidizable.

The picture obtained on zinc and developed by ether becomes very vigorous rapidly, if a weak solution of acetate or nitrate of lead be poured over it. By allowing this solution to act some time, the lead continues to be reduced, and gives a relief to the picture, of which advantage may be taken if the reduced lead does not encroach a little upon the adjacent parts.

As solvents of the linseed oil, I have tried spirits of turpentine, benzine, and chloroform; these solutions spread more regularly than ether, and yield a more uniform film, but whether because they leave a residue, or that, after their complete evaporation, the linseed oil has not the same molecular state, the film is less sensitive, and the results are not so clear and sharp.

I must note the principal defect of this linseed-oil process. The light tones of the negative disappear in the positive proof when the ether is poured on to dissolve out the non-impressed portions, and yet they exist previous to this operation; for by breathing strongly upon the plate, after separating it from the negative, we see, in a fugitive way, all the details of the picture. On this subject I shall make an observation which I believe to be important both for linseed oil and bitumen. We must distinguish in the sensitive film, thin as it is, two surfaces—the one external, the other internal—in contact with the substance which supports it. The insolubility produced by light commences at the external surface, because it is in contact with the air, the presence of which favours this action. In the most lighted portions it penetrates little by little into the interior surface, which becomes equally insoluble; but beneath the semi-transparent parts of the negative the insolubility is arrested at the external surface, or penetrates more or less, so that the interior surface retains nearly all its solubility. The ether, afterwards spread upon a film thus modified, first dissolves the parts which were entirely sheltered from light, then, without dissolving them entirely, it removes, little by little, and sweeps away, in a manner, the parts feebly impressed, because, fixed upon the external surface, they rest upon a basis which has retained its solubility. If the sensitive film were applied to a surface capable of performing the same office as the air, either from its nature, or from substances previously placed upon it, the insolubility produced by light would commence upon this very surface, and we might then hope to fix the effect of the most feeble radiations. The linseed oil forms a perfectly transparent film, and is better adapted to experiments of this kind than bitumen.

The Photographic Society will, I hope, excuse me for venturing to communicate a process which is still in its infancy; but isolated efforts, especially in a new direction, are very often barren in results; and I have felt the need of resorting to the intelligence and experience of all those whom a new agent in photography excites to new researches, and who do not shrink from undertaking long and onerous experiments.—*Bulletin de la Société Française de Photographie.*

Recent Patents.

MANUFACTURING AND APPLYING CHROMIC SALTS.

BY JEAN HENRI CHAUDET.

The details in the following specification, although not directly photographic, are so full of suggestion in regard to the various photographic printing processes in which chromic salts play a part (especially Willis's process), that it will be read with much interest, by all who have experimented in this direction. The specification is as follows:—

Sulphurous acid is a powerful reducer of oxygenic bodies, and possesses the property of bringing back to a state of base chromic acid, either isolated or in combination. By causing a current of sulphurous acid to pass into a solution of no matter what chromate, the chromic acid is disoxygenated and returned to a state of oxide. Sulphuric acid is thus formed, which combines with the oxide of chrome produced, as also with the base primitively combined with the chromic acid. In this reaction, independently of the sulphates formed, there are also produced a certain quantity of sulphites. It is this conversion of the chromates into sulphites and sulphates which I have essayed to utilise in order to obtain chiefly salts of chrome. I operate in the following manner:—In a cast iron retort, forming a continuation of the bellows or blowing machine, I introduce a certain quantity of sulphur, to which I set light. This retort communicates with the washer, which conducts to the reducer containing chromate in solution. On putting the bellows in motion, the sulphurous acid produced by the combustion of the sulphur is pushed into the solution of chromate, which takes it up, and the azote of the atmospheric air disengages itself from the apparatus. If bichromate of potash or of soda be employed, sulphates and sulphites of chrome, and of potash or of soda, are formed, which remain dissolved. If chromate of lime be employed, sulphate of lime is formed, which precipitates itself and sulphate of chrome which remains in solution. It is the same with chromates of lead and baryta. By adding to the chromates the equivalent in sulphuric acid of the base combined with the chromic acid, no sulphites are formed, and the operation is more rapid. It is by means of the salts of lime, of baryta, of lead, or other analogous salts, that I obtain sulphate of chrome of fairly pure quality in separating by filtration the insoluble sulphates so formed. In preference, I employ the bichromate of lime obtained direct from the treatment of chrome ore by lime. It is easy to produce economically hydrated oxide of chrome by means of the sulphate obtained as just stated; it suffices to precipitate it by means of ammonia or the alkaline carbonates. This oxide of chrome may be used advantageously in the colouring of glass and porcelain. I use the sulphate and nitrate of chrome as a mordant for wool and silk, in order to obtain entirely novel shades of colour with the divers tinctorial matters. For cotton and textile vegetable matters I employ the acetates, nitrates, citrates, and tartrates of chrome, which I obtain easily by double decomposition.

Here are the colourations given by the salts of chrome employed as mordant with the following tinctorial matters:—

Campeachy, blue and black blue.
Red wood, violet red.
Sanders, red.
Yellow or Jamaica rosewood (Morustinctoria), golden yellow.
Quercitron, clear yellow.
Woad or resida luteola, emerald yellow.
Persian berries, straw colour.
Roucou, flesh colour.
Curcuma, copper yellow.
Fustic, mahogany yellow.
Madder, fallow red.
Gall nut, fallow brown.
Sumach, yellow brown.
Catechu, sienna clay.
Cochineal, purple red.
Carmeline, carmine red.
Aniline, violet and fucbsia.
Yellow prussiate, green.
Orchilla, violet red.
Red prussiate, green blue.

I pass over in silence the extracts of the different tinctorial matters of which the colourations with salts of chrome agree with the immediate colouring principles above set forth.

By employing the soluble salts of chrome (sulphate, nitrate, and acetate of protoxide and sesqui-oxide of chrome) as mordant, fast colours are obtained, such as could not be obtained with the mordants hitherto used; for example, the colours obtained no longer turn green on exposure to the air, like those obtained by the use of bichromate of potash.

I explain this difference of fastness in the following manner:—In employing the usual bichromate of potash as a mordant, the chromic acid of the salt oxidizes the textile matter, and the colouring which is applied in such wise that the said colouring matter consumes and slowly destroys itself by this energetic oxidation produced by the oxygen arising from the chromic acid. The chromic acid, in transmitting its oxygen to the colouring matter, transforms itself into oxide of chrome, which is naturally green. It follows that the colouring matter being more or less destroyed, the green oxide of chrome appears, and the primitive shade becomes greenish. It is not so in employing the chrome in the state of oxide or base as mordant; the affinity of the oxide of chrome for the textile and colouring matters being considerable, the result is unalterable ternary compounds, and each of the elements composing them being fixed, they have no longer anything to mutually exchange and destroy themselves. In order to simplify the application of oxide of chrome as mordant, I determined to produce the conversion of the chromic acid into oxide of chrome on certain textile substances, such as wool, by employing the bichromate of potash as mordant. I have arrived at the desired result by putting in contact with the textile matter, mordanted by bichromate of potash, a reducing body, such as sulphurous acid, the alkaline sulphites, the organic acids, alcohol, sugar, and its congeners, and other bodies which possess the property of returning the chromic acid to a state of oxide; and after this operation the substance is washed, and afterwards dyed the desired colour. The conversion by reducers of the chromic acid into oxide of chrome on textile substances, furnishes colourations similar to those obtained by the employment of salts of chrome as mordant. To obtain mixed colours, a mordant with several colouring matters is employed, and often several mordants with one or more colourents. And these shades may be obtained by employing simultaneously my mordants of chrome in conjunction with old and well-known mordants.

The manufacture and application of the salts of chrome as a mordant in dyeing and printing textile substances being entirely new, I claim their exclusive manufacture and application in all the cases defined in this specification.

PHOTOLITHOGRAPHY, PHOTOZINCOGRAPHY, ETC.

BY F. J. BOLTON AND HENRY MATHESON.

If we understand the tenor of the following specification aright, it is the same in principle as the process of Messrs. Cutting and Bradford, patented several years ago. It is as follows:—

This invention of an improved process for producing printing surfaces has for its object to produce printing surfaces on stone, zinc, or other metal or suitable substance, partly by the agency of light, and partly by the action of chemical agents, on the surfaces to be operated upon, so that the surfaces when prepared may be used for printing therefrom with ink, as is well known in lithographic, zincographic, and other printing surfaces. In carrying out our invention, we take a lithographic stone prepared in the ordinary manner, or a zinc or other plate or suitable smooth surface, and in a darkened room we coat the surface evenly with a composition consisting of gum arabic, gelatine, or starch and bichromate of potash, or other base, depending upon the nature of the subject to be taken (dissolved in water). This coating must be thoroughly dried, and the photographic picture, engraving, or other object to be copied, is to be laid on the prepared surface, face downwards. The stone, plate, or other surface, with the picture or object on it, may then be exposed to the light for the proper time, according to the nature of the picture or object to be copied, and after it has been sufficiently exposed, it is to be taken back to the darkened room, and there soaked for several hours, with the prepared surface downwards, in clean water, in order to wash out the undecomposed gum from those parts which have not been affected by the light. It is of essential importance to the success of the operation that the undecomposed gum should be thoroughly washed out or removed from the plate, otherwise the picture will be defective. The plate must therefore be soaked for a lengthened time as before mentioned; and it is important that it should be placed in the bath face downwards, so that the gum as it dissolves shall by its specific gravity leave the surface of the stone or plate, and be deposited at the bottom of the bath. After it has been thoroughly dried, the stone or plate may be exposed to the light without fear of injury. The surface thus treated leaves a film in the parts decomposed by the light impermeable to the solution hereinafter described, provided water or other liquids or substances capable of softening the film are carefully excluded in the preparation of the said solution, and which exclusion we are careful to observe. A solution of alkaline soap, or of the components of such soap, freed as much as possible from moisture and other substances capable of softening the film, is then prepared: the soap is dissolved in turpentine (or other solvent, free as possible from water, will do as well). This solution is then poured or spread over the surface of the stone or plate, and allowed to stand until the solvent or turpentine has evaporated. This will leave the fatty salts in the pores of those parts of the stone or surface of the plate which have not been acted on by the light. The stone or plate must now be soaked thoroughly with a strong solution of bichromate salt. The stone should be previously rinsed with water, or a liquid containing water, to remove the superfluous soap or its components, and to ensure the adhesion of the ink in the after process of printing. Other salts, acids, or substances capable of decomposing the soap or its components without decomposing the stone or other support to the film, will answer the same purpose, but we prefer to use a bichromate. The bichromate salt, or other suitable substance as above mentioned, will fix the picture tenaciously to the stone or other material, and will prevent spreading or blurring of the fine detail. This effect is produced by the alkali or oxides of the soap or fatty salts combining with the chromic acid of the bichromate salts and precipitating the fatty acids. The surface thus prepared may now be printed from with printer's ink in the usual manner. Instead of producing the printing surface direct on the stone or plate, we sometimes print the picture from the negative on to a sheet of paper or other flexible material, in which case the saponaceous solution should be applied from the back, and the solvent of which may be water, the manipulation being otherwise the same. We transfer the picture, which must be damp, from the paper or flexible material to the stone plate or printing surface, from which any number of prints may be taken in the ordinary manner. It will be understood that this process may be adapted to chromo-lithographic printing, as several surfaces prepared as above may be used for producing pictures in colour in the usual manner of colour printing. As a modification of the above, we also in some cases print the picture from the negative on to a thin sheet of metallic foil, the surface of which is rendered sensitive and prepared in the manner already explained. When the picture has thus been transferred to the flexible metallic surface, the latter may be fixed on a block, or otherwise backed up, so that it may be printed from in the ordinary manner.

Having now described our invention of an improved process for producing printing surfaces, and having explained the manner in which the same is to be performed, we claim as the invention secured to us by letters patent as aforesaid the process herein set forth for producing printing surfaces by the agency of light in combination with chemical substances.

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DE LA RUE AND CELESTIAL PHOTOGRAPHY.*

Referring to the 'Report on Celestial Photography in England, 1859,' we find full confirmation of these views. "Portions of the moon, equally bright optically, are by no means equally bright chemically; hence the light and shade in a photograph do not correspond in all cases with the light and shade in the optical picture. Photography thus frequently renders details visible which escape observation optically, and it therefore holds out a promise of a fertile future in selenological researches; for instance, strata of different composition evidently reflect the chemical rays to a greater or less extent, according to their nature, and may be thus distinguished. The lunar surface very near the dark limb is copied photographically with great difficulty, and it sometimes requires an exposure five or six times as long to bring out completely those portions illuminated by a very oblique ray, as others apparently not brighter but more favourably illuminated. The high ground in the southern hemisphere of the moon is more easily copied than the low ground, usually called seas, which abound in the northern hemisphere. From these circumstances, I ventured in another place ('Monthly Notices of Astronomical Society') to suggest, that the moon may have an atmosphere of great density, but of very small extent, and that the so-called seas might be covered with vegetation."†

In 1853, Professor John Phillips indeed noticed this difference between the visual and the actinic brightness of portions of the lunar surface.‡

The application of photography to the planets by Mr. Warren De la Rue and others confirms this fact. For example, the occultation of Jupiter by the moon on November 8th, 1856, afforded an excellent opportunity for comparing the relative brightness of our satellite and that planet. On that occasion, Jupiter appeared of a pale greenish tinge, not brighter than the crater Plato, and according to Mr. De la Rue's estimate, of about one-third the general brilliancy of the moon; but the actinic power was subsequently found to be equal to fully four-sixths or five-sixths of that of the moon. "Saturn," says the same observer, "required twelve times as long as Jupiter to produce a photograph of equal intensity, on an occasion specially favourable to making the experiment; yet I obtained a picture of Saturn, together with that of the moon, in fifteen seconds on May the 8th of the present year (1859), just as the planet emerged from behind the moon's disc. The picture of the planet, although faint, is sufficiently distinct to bear enlarging."

Jupiter, Mars, and Saturn, together with several of the fixed stars, have been photographed; but the promise afforded by these chemical pictures is not of that high character which belongs to those of our satellite. Studying the large picture of the moon, hanging in the Royal Society's room, which has been produced by the aid of photography, we cannot but feel that we have a wonderfully minute representation of the lunar surface before us. We see, and we can measure the heights of her mountains and the depths of her valleys. Her coasts and cliffs, against which we cannot but think an ocean has at one time beaten its waters, are readily determined. We cannot mistake the craters of eruption, and we are puzzled with such as we must call craters of upheaval, vast swellings, the result of some mighty power which was yet insufficient to burst the stony bubble. Precipices so vast that darkness reigns in the profound depths over which they rise, and glens which appear indeed resigned to all the influences which superstition crowds into such weird gloom, are there. Can we not trace glacial moraines? But to what are we to refer the mysterious streaks of light which flow from some of the lunar mountains? We cannot but hope, seeing how much has been done, that we shall have continuous photographic records of the moon's surface. We may then expect to have a more exact knowledge of that lovely orb which belongs especially to our earth, and which is therefore of no common interest to the inquiring mind.

Upon the occasion of Mr. De la Rue's visit to Rome, an attempt was made, as a secondary object, by comparing the distances of the moon's and sun's centres with the tabular places, to ascertain whether any correction was necessary to the sun and moon's tabular diameters; and it was found that the latter were in excess of the observed diameters. The correction assigned to the moon's radius from two sets of the observations has been recently computed to be 2″·15, which agrees closely with the correction Mr. Airy has found to be necessary from M. Breins' reductions of forty years' observations of disappearances and reappearances of stars at the moon's dark limb during occultations.*

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* Continued from p. 334.

† 'Transactions of British Association, 1859,' p. 145

‡ Ibid, 1853. 'Transactions of Sections,' p. 16.

From 1860 to the present time, the observations by the Kew heliograph have been placed by the Council of the Royal Society under Mr. De la Rue's direction. From February, 1862, to February, 1863, the instrument was removed to the Observatory at Cranford, but a qualified assistant having been trained for the Kew Observatory during that interval, it has been worked continuously at that establishment from May, 1863, until the present time.

The object in view is, of course, to obtain the most perfect record possible of all the physical changes which take place on the sun. "The progress of science," says Mr. De la Rue,† "has hitherto only shrouded in deeper mystery than ever the origin of that wonderful outpouring of light and heat which is the sun's most prominent characteristic; and to this very day it has not been finally decided whether this luminosity proceeds from the sun's solid body, or from an envelope which surrounds it. Indeed, so strange and so unaccountable are many of the features presented to us, not only by our own sun, but by many of the stars, that it has even been conjectured that these bodies exhibit instances of the operation of forces of the nature of which we are yet ignorant. If we accept this view of the case, the study of our luminary becomes one of very great importance, but one in which we must be very careful to be guided by observation alone. We must obtain numerous and accurate representations of the sun's surface, and study these carefully and minutely before we attempt to generalize."

In the 'Researches' from which we have quoted, we find recorded no less than 631 groups of solar spots, which have been photographed at the Kew Observatory from March 11, 1858, to December 31, 1864. The value of such a continuous record as this can only be thoroughly understood by those who have given some careful attention to this class of phenomena. This is not the place to discuss the questions which have arisen with regard to the nature of solar spots. Still it is important that a general idea should be given of the conclusions to which Mr. De la Rue and other astronomers have arrived with respect to them.

It was first stated by Dr. Alexander Wilson, of Glasgow, in 1773, that certain phenomena appeared to indicate that spots are cavities in a luminous photosphere which surrounds the sun. Mr. Dawes has shown that we have often connected with the same phenomenon—the formation of a sun spot—not less than five degrees of luminosity:—1. The faculæ, or bright streaks of irregular direction; 2. The ordinary photosphere; the *luminous* envelope of the sun; 3. The penumbra, or shaded portion of a spot; 4. The borders of the umbra; and 5, the very dark central nucleus. The term *umbra* is used by Mr. Dawes to denote a region of a spot intermediate in darkness between the nucleus and that designated as usual by the term *penumbra*.

It should be understood that the photographs of the solar surface show with great distinctness those five degrees of illumination. Indeed, these are so decidedly delineated on the collodion tablet, that by calling in the aid of the electrotype process, Mr. De la Rue has been enabled to obtain plates, from which any moderate number of copies can be printed off.

The Kew photographs have already confirmed the results of some previous observations, and established some new and important facts. We have only space to state these as concisely as possible.

1. These photographs prove the central portion of the solar disc to possess a higher degree of luminosity than the borders.

2. They have shown that the *umbra* of a spot is nearer to the sun's centre than the *penumbra*; that is, it is at a lower level. The solar spots are, therefore, cavities in the photosphere.

3. It appears fair to conclude from the examination of all the sun pictures in which the *faculæ* are copied, that "Solar faculæ consist of solid or liquid bodies of a greater or less magnitude, either slowly sinking or suspended *in æquilibrio* in a gaseous medium."

Another paragraph must, from its importance, be quoted—"The idea that faculæ are portions of the photosphere raised above the general surface, appears to be confirmed by stereoscopic pictures of spots obtained by Mr. De la Rue, where the faculæ appear as elevated ridges surrounding the spots. Accepting this conclusion, we next remark that faculæ often retain the same appearance for several days together, as if their matter were capable of remaining suspended for some time."

The deductions to be drawn from a careful study of those solar autographs are, that the lower parts of a solar spot are of a lower temperature than the photosphere in which it is formed. Whether this is due, as some suppose, to the lower temperature of the body of the sun, or to matter coming from a colder region, as is more generally thought, remains yet to be determined.

Chacornac and Lockyer have recorded observations, on the behaviour of the matter surrounding a spot, which appear to suggest the existence of a downward current, which is, therefore, a current from the colder regions above. The faculæ in the larger number of examples fall behind the spots. This appears to suggest an ascending current carrying the hot matter behind. Thus possibly two currents are concerned in the formation of a sun spot; if so, assimilating them to our terrestrial cyclones, which in many other respects they resemble.

The importance and the extension of this system of continuous observation must be evident to all; and it is satisfactory to know that a second heliograph has been made under Mr. De la Rue's direction for the Russian Government, which is now erected at Wilna, the director of that observatory, Dr. Sabler, having received instruction at Mr. De la Rue's observatory at Cranford.

On several occasions, at the Astronomical Society, Mr. Warren De la Rue has pointed out the advantages which will be derived from the use of photographic apparatus for recording future transits of Venus. In the words of the address on the presentation of the Lalande prize, we may bring our notice of Celestial Photography to a conclusion:—"By his own example, by giving instruction to others who desired it, and by continuous observations of his own, Mr. Warren De la Rue has been untiring in promoting astronomical photography; and it may be safely claimed for him that the bringing of this branch of science within the domain of calculation, marks a new era in practical astronomy."

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THE FADING OF PHOTOGRAPHS.*

We published in our May number a communication by Dr. Angus Smith, of Manchester, in which he proposes to remove the final traces of hyposulphite from photographic prints by converting them into sulphates by means of peroxide of hydrogen. The subject has excited considerable interest, and Mr. F. W. Hart has revived a former proposition he had made for effecting the oxidation of the hyposulphites by a much more inexpensive agent.

Our object in referring to the matter now is to point out what we conceive to be a fallacy at the basis of the question. It is assumed that the final traces of hyposulphite of soda are the chief causes of fading, an assumption which our own experience does not justify. It is a somewhat singular fact, which we do not wish to be regarded as a justification of careless manipulation, that amongst the photographs which we have known to remain unchanged for the greatest number of years, are many which received very little washing indeed; whilst, on the other hand, many of those which have hopelessly perished had no lack of washing. We believe the evil is generally commenced in the fixing-bath, which no amount of washing or treatment with oxidizing agents will remove. The use of a fresh strong solution of hyposulphite of soda will do more for the permanence of the print than any after treatment of a print fixed in a hypo solution in which incipient decomposition is set up; and it is to this point we would urgently direct the attention of our readers.

We notice a communication from Dr. Emmerson Reynolds, in a contemporary, in which he states a conviction that the hyposulphite is not eliminated by peroxide of hydrogen, and states a series of experiments bearing out his opinion, the practical issue of its use being to give the print a wash of a weak solution of sulphide of sodium, and so hasten the destruction of the picture.

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* 'Monthly Notices of Astronomical Society.' vol. xxv., p. 264.

† 'Researches on Solar Physics.' By Warren De la Rue, F.R.S., Balfour Stewart, F.R.S., and Benjamin Loewy. (First Series, "On the Nature of Sun Spots.")

* *Journal of the Photographic Society.*

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ON NITROGLUCOSE PAPER FOR ENLARGEMENTS.

BY DR. D. VAN MONCKHOVEN.*

I. *Positive and Developed Pictures.*

If a very pure, perfectly unsized paper is dipped in a solution of common salt, and then in one of nitrate of silver, pure chloride of silver is produced in the texture of the paper, which, when the dried paper is exposed to the action of light under a negative, gives an impression of it in a grey colour, of the same shade as that of metallic silver. If, instead of unsized paper, paper is taken which has been sized with starch, gelatine, or albumen, the image is obtained not in a grey but in a warmer, violet colour. In the latter case the picture contains, besides chloride of silver, an organic compound, formed from the substance used for sizing and the nitrate of silver.

This fact, which has been known for years, is universally applied by professional photographers, who in general use paper which has been strongly sized with albumen. The albumen paper, made sensitive by nitrate of silver, is exposed to the light until the tone of the picture has become sufficiently intense to resist the action of fixing solutions. Yet every one knows that the paper may be exposed for only a short time to the action of light, and a scarcely visible picture produced; and by subsequently dipping it in an aqueous solution of gallic acid, the action of light can be continued. The picture develops very well; yet a time soon arrives when the picture becomes yellow at the parts which should remain white. Besides developing, gallic acid exerts a special action on the albuminate of silver that originally constituted the sensitive layer, which action consists in colouring the albumen yellow. Hence, albumenized paper can as little as gelatinized paper be used for the ordinary process by developing. The paper sized with starch and gelatine may well be used for the developing process; yet the pictures become grey and dull, which is not pleasant to the eye. For years the method of making positive pictures by development has been given up, and the method of direct printing used—a method which takes a good deal of time, but furnishes good results. Another sizing process, which depends upon the use of decomposed nitroglucose, may perhaps change the usual process.

II. *Preparation and Properties of Nitroglucose.*

To a mixture of equal volumes of sulphuric and monohydrated nitric acid, which has been cooled to the freezing-point of mercury, as much sugar is added, in pieces the size of a pea, as the liquid can take up, and the mass left to itself for half an hour. During this time the sugar takes up some of the nitric acid, and is changed into nitroglucose. (If a higher temperature were used, the sugar would frequently decompose with formation of red vapours of nitrous acid, and the operation be spoiled.)

The acid is slowly poured off, the nitroglucose (which forms a gummy mass) removed with a glass rod, and well washed in cold water, pressing it even with the hands. The mass is then dissolved in alcohol, the solution filtered, and precipitated by the addition of water, in which nitroglucose is insoluble. The precipitation is not perfect until, after some hours, it yields a white gummy body, insoluble in water, but soluble in alcohol. The body must be very carefully handled and in small quantities; for it explodes, like nitroglycerine, in an exceedingly dangerous manner, without any assignable reason for doing so.

The alcoholic solution of nitroglucose and of nitrate of silver give, when mixed, no precipitate, if the latter has been freshly prepared. Yet, if it has been prepared for some days, a precipitate is obtained.

Nitroglucose decomposes rapidly in contact with alcohol, which changes into nitrate of ethyl; at the same time there is deposited a resinous product of nitroglucose, resembling that which, under similar circumstances, is formed from pyroxyline. In the space of a few months nitroglucose entirely disappears, as it does in a few hours if the acoholic solution is exposed in closed glass tubes to a temperature of 100°.

The product of the decomposition of nitroglucose yields a substance for sizing paper which agrees with albumen, and in contact with nitrate of silver yields an organic compound which resembles albuminate of silver, and under the action of gallic acid does not become yellow like the latter, but remains white. Hence nitroglucose paper can be developed upon, while this is not possible on albumen paper.

III. *Preparation of Nitroglucose Paper.*

The solution of 500 grammes of undecomposed nitroglucose in one litre of alcohol, placed in a stoppered vessel, is allowed to stand for several months in a warm place, and is then poured into 50 litres of water, which contains two per cent. of common salt. In this liquid the paper is dipped for five minutes, while the paper, which is an opalescent white, is continually stirred. (I have hitherto kept such paper for eighteen months without noticing any deterioration.) The paper of Mr. Steinbach, of Malenedy,* appears to me the best. I find it very firm, free from iron spots, and of very uniform texture; it is just as good as *Rive* paper (which is dearer), and is far better than the English papers.

IV. *Sensitizing the Paper (in the dark).*

The silver bath is prepared by dissolving in 5 litres of distilled water 200 grammes of crystallized nitrate of silver, to which 100 grammes of glacial acetic acid, and 25 cub. cent. of nitric acid have been added. This bath is then placed in a porcelain vessel, and paper completely immersed in it for two minutes. The paper is then hung up and dried. In this way a definite number of papers are prepared.

After each preparation of ten sheets of paper (45 by 59 centimetres) in the bath, twenty grammes of nitrate of silver are added to it, to keep it constantly of the same strength.

When the paper is dry, it can be used at once, or kept in a drying-box over chloride of calcium.

It is best to prepare the paper the day it is used, and develop at once.

V. *Exposure of the Paper.*

Under a negative the picture is sufficiently printed in four minutes in the shade, or half a minute in the sun. Care must be taken not to examine the impression by daylight, but only in the dark by the aid of a candle; for otherwise the whites appear dirty. If there is a lengthened exposure, this exerts no deleterious action, but the image appears quicker in the developing bath.

VI. *Development of the Picture.*

This is the most important operation. It must be effected in the dark-room by the light of a single candle, glass or porcelain dishes being used. The greatest cleanliness is absolutely necessary: the dishes must first be washed with a wet sponge, then rinsed out with pure water, and dried with a clean linen cloth; then, by means of a brush, the edges and the bottom of the dish are moistened with the following liquid:—

Water	100	grammes
Cyanide of potassium	20	,,
Iodine	5	,,

This liquid is prepared beforehand, and may be preserved for several days. When this has acted a few minutes, the dish is once more washed with plenty of water, and then dried, upon which it is ready for use.

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* Read before the Vienna Photographic Society, on the 15th May, 1866.

* This is the usual *Saxe* paper.—Ed. P. N.

In a divided measure, 10 cubic centimetres of solution No. 1 are accurately measured (alcohol 900 cub. cent., glacial acetic acid 100 cub. cent., gallic acid 200 grammes); this is poured into a flask of about a litre capacity, while in the same measure are measured (without rinsing) 20 cub. cent. of crystallizable acetic acid, which are also added to the flask; 100 cub. cent. of distilled water are then added, and the liquid properly mixed by stirring.

After the measure has been purified by distilled water, 10 cub. cent. of liquid No. 2 (distilled water 600 cub. cent., glacial acetic acid 400 grammes, nitrate of lead 200 grammes) are measured, poured into a large flask, again stirred, and the measure cleaned out with water.

The contents of the flask are now poured into four litres of distilled or rain-water (distilled water is best), and properly mixed.

Upon this 20 cub. cent. of solution No. 3 (tartaric acid 200 grammes, glacial acetic acid 200 cub. cent., distilled water 500 cub. cent.), with stirring, is poured into the rest, upon which the development is ready. It must be used immediately, and be poured into a glass or porcelain vessel.

Correspondence.

LOSS OF SENSITIVENESS IN DRY PLATES.

Sir,—I think no photographer has ever examined the beautifully tinted picture depicted on the focussing screen of his camera without a feeling of dissatisfaction at the comparatively poor result of his attempts to transfer it to some durable material; however otherwise faithfully true a photograph may be, the want of the exquisite variety of colours which so admirably adorns the scenery of nature, and renders it so charming to the eye, must ever be a subject of regret, and serves to remind the photographer, that until he can truly define colour as well as form, his art is still incomplete.

The discovery of some process by which objects can be represented in natural colours is surely not impossible, although perhaps that task may be reserved for a future generation; in the meantime, it remains for us to do what we can to perfect the processes at present known.

The possibility of producing a dry plate by the use of which a picture can be obtained equal in quality and with as short an exposure as characterizes the wet, has been an object long and perseveringly sought, and the advantages it would confer upon all classes of photographers are plain and manifold. A photographer by profession, and having, therefore, an interest in the advancement of the art, it has occurred to me, that if the causes of the phenomena involved in the development of the latent image were plainly described and thoroughly understood, they would serve as sure guides to those who, more fortunate than myself, were possessed of time and ability to prosecute the experiments necessary to the attainment of this object. For this purpose I have lately written several papers explaining those more particularly pertaining to the wet process. I now propose to explain, as clearly as I can, the reason why a collodion plate loses its sensitiveness when dry.

As this sensitiveness depends upon the perfect balance of two opposite forces, it is evident that if, by any alteration in the composition of the film, this balance is disturbed in favour of either, a correspondingly increased effort will be required of the other to overcome this accession of strength to its antagonist. By the evaporation of the water contained in the film, the cohesive forces acquire a considerable increase of power, the same equal balance is no longer preserved, and it is therefore only by a proportionate increase of energy that the forces of separation can establish the magnetic action of the latent image.

Various means of producing in a dry film the same, or nearly the same, equilibrium of forces observed in the wet, have been employed with more or less of success, but as the conditions under which they are obtained are imperfectly known, failures are both numerous and disheartening. The most common cause of failure, when a dry process is tried for the first time, is a tendency to fog, and as the cause of this is incidental to all dry processes, it ought to be thoroughly understood. When any organic matter is added to the collodion film for the purpose of rendering it sensitive, when dry, to the disturbing influence of light, the balance of forces, when wet, is no longer preserved; the solar forces preponderate over the terrestrial, and at ordinary temperatures a magnetic action is established, which renders it an impossibility to obtain a clear image until, by some means, this action is destroyed. Now it is very possible that this is not accomplished directly the film dries, and therefore, if the plate be used too soon after preparation, it fogs in the process of development, and the operator, disgusted at his failure, abandons that particular process, and tries another, with the same haste and the like result. The obvious remedy is to place the prepared plate in a cool, dry spot a sufficient time to allow of the gradual cessation of this action, when a perfectly clear picture can be obtained without difficulty.—I am, sir, respectfully yours,

Yarmouth, July 16th, 1866. Thomas Ayers.

ENLARGEMENTS.

Dear Sir,—I am glad to observe the modified tone of Mr. Sydney Smyth on this subject, which I believe to be one of such high importance to professional photographers, owing to the growing public demand, that it becomes very desirable to definitely settle what is possible.

Your leading article, two weeks ago, on the "artistic and commercial aspect" of the question, was exceedingly exhaustive, and deserves the careful study and best thanks of all interested; but it scarcely gives sufficient prominency to the points raised in the first instance by "An Artist," viz., the possibility of obtaining from existing negatives such enlargements as are *available* for artistic finishing, and the galling disappointment felt on paying money and receiving perfectly unusable impressions from negatives known to give satisfactory prints.

The most valuable phase of enlarging is its applicability to *existing negatives*, and for this purpose the solar camera is a useless instrument; but by another process, I unhesitatingly affirm (after a number of years' careful experience) that from *any ordinary printing negative in a photographer's stock*, an enlargement can be made so little inferior to the original, as to be everything that an artist can desire, and this, too, at all seasons when a good negative can be taken in the operating room.

In this climate of ours, which an ill-natured Frenchman remarked was made so changeable purposely to furnish the people with a subject to talk about, a solar camera is practically useless. True, the most perfect results can be obtained with this instrument by printing out from a specially prepared negative, but technical excellence is not practical utility. This is desired, and *can* be obtained. Thanking you, I am yours faithfully, J. W. Pickering.

18, *Moor Street, Birmingham*, 17*th July*, 1866.

Talk in the Studio.

New Opal Glass Printing Frame.—Mr. L. Field, of Birmingham, has just patented an exceedingly complete and ingenious print frame, suited for pictures on either glass or paper, and printing pictures of various sizes. So far as our present examination of it goes, it appears to be one of the most complete we have seen. We shall take an early occasion of testing it; we will then report and describe it more fully.

THE UNITED ASSOCIATION OF PHOTOGRAPHY.—We learn from Col. Stuart Wortley that he has not left the directorate of this association, but that, owing to other duties, he is unable to continue in the position of managing director, which he has occupied until now. Col. Stuart Wortley has received an appointment, under the new Government, as Secretary to Lord John Manners, at the Board of Works.

THE CASKET PORTRAIT.—The *Flaneur* in the *Morning Star* says:—Mr. Henry Swan, of the Casket Portrait Company, Charing Cross, has produced for the Historic Society of New York a portrait of Mr. Bright, which is one of the happiest examples of this happiest application of the photographic art. The process deserves to be far better known than it is, for though somewhat more expensive than ordinary photography, it is so vastly superior in effect, and so infinitely capable of decorative and monumental use, that its special advantages more than compensate for its trifling excess of cost. The distinctive merit of these crystal portraits is that, without the use of the stereoscope, they produce a permanent binocular effect —so complete that, on looking into the crystal cube in which the counterfeit presentment of the sitter appears to be embedded, one sees what it would scarcely be possible to distinguish from the animation, colour, solidity, and form of life itself, but for the diminution in size. The cubes are capable of being mounted in any ornamental manner, and a visit to Mr. Swan's rooms suffices to suggest the employment of photographic portraiture for drawing-room decoration to an extent and with an effectiveness impossible on any other principle. Amongst the other portraits exhibited is a marvellously life-like one of Lord Brougham; and Mr. Bright's is equally a triumph of resemblance of expression and of binocular reality.

KID GLOVES AND PHOTOGRAPHY.—An enterprising firm in Brussels, it is said, employs one person to make sittings only. This individual is dressed in the latest style, and always wears white kid gloves while posing the subject. No pair of gloves is used for more than one sitter without being cleaned, as each one is honoured with a fresh pair. The contract for cleaning the kids used by this personage is said to be worth several thousand francs per annum.

PRESERVATION OF SENSITIVE PAPER.—Marowski recommends to preserve sensitive paper between sheets of waxed paper. Ernst, that prints which have a yellowish colour in the whites can be cleared by plunging in an extremely weak bath of cyanide. Grüne confirms this; the bath should not be stronger than 1 grain to 4 ounces. Remelé remarks that Nauk's process of preserving sensitive paper in a chloride of calcium box answers only with plain arrow-root paper, and is ineffectual with the albumenized. Vogel, that the purity of the atmosphere has much to do with the keeping properties, the presence of very little sulphuretted hydrogen acting very unfavourably. Kunstman, that floating too long on the silver bath (five minutes or more) tends to yellowness. Ernst, that papers themselves have much influence. Vogel, that a want of freshness in the albumen acts unfavourably, and that some English papers keep remarkably well when sensitized. Wenske, that paper sensitized on ammonio-nitrate bath had kept two weeks between yellow plates. Prumm recommends the addition of a few drops of nitric acid to the positive bath in hot weather. Vogel, that sensitized paper dried by heat turns yellow more easily, the silver salt altering the albumen.—*Philadelphia Photographer.*

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To Correspondents.

WILLIAM GREEN.—The stains on the prints you forward are produced by handling unfixed prints with fingers which have touched hyposulphite of soda, or immersing them in a dish which is not perfectly clean, but is contaminated by traces of hyposulphite. 2. There is no method of removing such stains when once formed. 3. There is no danger of any kind of injury to the prints if kept for a short time between toning and fixing, provided they are immersed in clean water in a perfectly clean dish. It is very important at frequent intervals to thoroughly cleanse all the dishes; and it is still more important to keep each dish to its own use. For instance, never wash prints before or after toning in dishes used to wash them after fixing, as the latter generally have traces of hyposulphite hanging about them. In short, keeping toning dishes for toning; dishes for washing before toning and fixing solely for that purpose; never, by any chance, use the hypo dish for any other purpose; and keep the dishes for washing the prints after fixation to that use and no other.

G. SMITH.—For ordinary landscape and architectural purposes we prefer the old achromatic triple lens.

J. CLEVERE JONES.—Thanks for the address. It shall be duly forwarded to the proper quarter.

R. M. A.—So far as we know, plates by the Gordon modification will probably be deteriorated by keeping for a fortnight. Mr. Gordon's own experience of plates kept that length of time was, that they required much longer exposure than when freshly prepared. For certainty, we should prefer the collodio-albumen process. The ordinary Fothergill process is also very good. Our personal experience with Mr. Sayce's process is scarcely sufficient to enable us to give a decided opinion. In Mr. Sayce's hands, it has given some of the best pictures we have ever seen produced on dry plates, and it is one of the most sensitive of the dry processes. Whichever process you adopt, prepare a few trial plates, and assure yourself that you have mastered the manipulation before you commence your tour. See Mr. Keene's article in the present number.

WOLSTENHOLME BROTHERS.—Thanks for the description, which we shall take occasion to publish.

NITRATE BATH.—In making a nitrate bath for summer use, thirty grains per ounce will be found sufficient. If the nitrate of silver be pure, and the water be pure, it will probably work well at once, with no other addition than from one to two grains of iodide of potassium for each pint of bath. If you do not find it work quite clean and free from fog, add about one drop of nitric acid to each pint of solution. If it work still unsatisfactorily, add a few drops of a 10-grain solution of carbonate of soda until a slight permanent turbidity is formed; or a little moist oxide of silver, sun for a few hours, slightly acidify, and then try again. In all cases, sun after adding oxide of silver, or any alkali. 2. Oxide of silver is formed by precipitating it from a solution of nitrate of silver by adding caustic potash, and well washing the brown precipitate, which is oxide of silver. 3. There are many articles on opal printing scattered through the last volume of the PHOTOGRAPHIC NEWS, from which you will obtain the fullest information that is to be had on the subject.

R. P. L.—The print must be again fixed after any application of gallic acid and nitrate of silver; any trace of a silver salt left in the print would certainly darken, and simple washing will not remove all traces. Possibly, after thorough washing, the application of a weak fixing bath may be sufficient; but we should endeavour to avoid this necessity for a second application of silver and developing solution by changing the sample of paper, in which the evil probably lies, if your manipulations be right. Do you develop sufficiently? Are you careful to wash very thoroughly after developing, before fixing? A very slight trace of gallic acid and silver left in the paper would cause discolouration. It is sometimes desirable to wash with warm water before fixing.

A. BEAL.—What are the appearances in the print which induce you to think it is not fixed? Three-quarters of a pound of hyposulphite ought to fix many sheets. As a rule, one ounce would be sufficient for each sheet fixed. It is better, with developed prints, to use a stronger solution than that you name. 2. Ordinary commercial nitrate of silver will answer the purpose. 3. Much depends on the formula you are using; in some cases, as much acetic acid as nitrate of silver. You will find a formula in our YEAR-BOOK. 4. The addition of acetic acid to the gallic acid depends on circumstances. If the silver bath is sufficiently acid, no acid need be added to the gallic acid, except in very hot weather. Observation of the result is the best guide. If the whites begin to discolour, and the solution to decompose before the development is completed, acid is generally required.

WEYLLAND WHIPHAM.—Thanks for the description, which we shall take early occasion to use. The iron salt enclosed is certainly not a sulphate of iron. It is apparently a sulphide, and is of no use for developing purposes.

B. F. R.—In printing with the solar camera direct on albumenized paper, the same materials and formulæ are used as in printing in the pressure-frame. The time will vary with the amount of enlargement, the density of the negative, the size of the condenser, &c. For life-size, an exposure of from one to two hours will probably be required. There is no restriction now in the manufacture of the solar camera, as the patent has expired.

F.—The process of photo-zincography used at Southampton is not patented. Col. James has issued a work on the subject. It is published by Longman and Co., and the price is, if we remember aright, twelve shillings. M. Poitevin was the originator of the methods of photo-lithography now in use, but not of the earliest attempts to apply photography to the lithographic art. That was done at a much earlier date.

M. W.—The poverty of your tones is due to the imperfection of your negatives. They are too thin to permit sufficiently deep printing, and without a sufficient depth of reduced silver in the shadows of your prints it is impossible to produce good rich blacks. The yellow stain is the result of touching the print with fingers which had been in contact with hypo, and the decomposition and brown colour of your toning bath were probably due to the same cause.

Several Correspondents in our next.

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Photographs Registered.

MESSRS. PLUMTREE AND SMITH, Alford, Lincolnshire,
Two Photographs of Lincolnshire Rifle Volunteers.

MESSRS. J. AND E. OWEN, Newtown, Montgomeryshire,
Photograph of Llandilocs Old Market Hall.

MR. H. KEET, Liverpool,
Two Photographs of the Laying the Foundation Stone of the Infirmary for Children, Liverpool.

MR. THOS. KIRKBY, Trentham,
Four Photographs of Front of Trentham Hall—with Cavalry, &c.
Six Groups of the Guests at Trentham Hall, June 26.

*** All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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VARIOUS MODES OF RETOUCHING NEGATIVES.*

There are many cases in which the negative requires modifications or additions more important than can be effected by means of chalk or pencil, and in which the application of a pigment is desirable. The question then arises as to the most desirable pigment and the most desirable vehicle for that medium. Ordinary water colours involve very little trouble, but they lack some advantages of those mixed with a varnish medium.

Retouching with Water Colours.—For slight retouching, water colours have certain advantages. Where it is simply necessary to stop up pinholes, &c., nothing better is required, the lead pencil being unsuitable for this work, the touch it applies being rarely sufficiently opaque for this purpose. It may also be used with advantage where very fine stippling is required in removing strongly marked freckles and wrinkles, for which the light touch of the lead pencil is insufficient. Some of our best portraitists adopt this method with considerable success. It is important, in work of this kind, to employ a colour which works well and is not opaque or non-actinic. The most skilful stippling with an opaque or non-actinic colour would produce in the print a series of white spots of a very unsatisfactory character. It is desirable, therefore, to work with a blue pigment, and we know nothing better for the purpose than cobalt, which works well, is moderately transparent, and yields in the print a very delicate result, in which, if well done, the retouching is only apparent in the absence of the coarse black texture by which photography renders a freckled face.

Herr Schrank, in describing the method employed in Germany, of retouching with water colours, recommends that the negative should not be varnished, but treated first with gum-water. After that is dry, it is to be coated with plain collodion, and on this surface the colours are to be applied, avoiding moist water colours ground up with honey, as being hygrometric, and subsequently, therefore, attracting moisture. The choice of pigment will, to some extent, depend on the amount of opacity desired. If delicate half-lights only are to be put in, a transparent colour, not non-actinic, will still be selected; but if strong lights are required, a non-actinic colour, like cadmium yellow or Indian red, will be selected. The colours will be applied with a short-haired sable with a fine point, and used with as much judgment and skill as the manipulator possesses. When the operation is complete, a print should be taken, and if the result is satisfactory, the negative should now be varnished, for the double purpose of preventing the colour from getting rubbed off, and also of preventing it from further darkening, which sometimes happens to water colours on negatives on coming into contact with the silvered surface of the paper.

Colours with an Oil or Varnish Vehicle.—Herr Grasshoff, in describing the retouching of landscape negatives, for which he considers the lead pencil insufficient, recommends a vehicle of which he speaks very highly as being easy and pleasant to work with, and giving a waterproof surface to the applied colour. It consists of equal parts of yolk of egg and boiled linseed oil, with a little siccative, or "driers." These are well mixed, a little water also being added. The pigment to be employed having been rubbed up with a little water on a slab or palette, is then mixed with the medium, and kept bottled ready for use. This is described as more easy to apply than water colours, as drying more evenly, and not rubbing off the negative easily when dry. It permits the surface of the negative to be lightly sponged without being washed off, although it can be removed by continued application of water. When dry, it is not at all greasy, and does not injure the print by contact with it. The pigment is very much a matter of taste; that recommended by Herr Grasshoff is described as "Vandyke Red," a name not known to artists' colourmen in this country. It is probable that for non-actinic colours Venetian red, Vandyke brown, or burnt sienna, will work well in such a medium, and for a colour less opaque to light cobalt may be employed. This is to be applied, of course, to a varnished negative, and care must be taken that the colour is dry before placing a print in contact with it.

Rabending's Method.—We have mentioned that the finest result we have ever seen from a retouched negative is that by Herr Rabending, who has acquired a celebrity in Germany for skill in this direction. The method ascribed to him is somewhat singular. He employs, we understand, for retouching the negative, the material of which the negative is formed. An excited collodion film is exposed, developed, and fixed, or the film of an old negative is taken. This is then ground with a little turpentine varnish until it forms a perfectly smooth homogeneous paint of reduced silver and collodion film. It is diluted for use with a little turpentine varnish, and then applied to the negative, which is very delicately stippled, a magnifying glass being used, we believe, to assist the operator in securing a delicate effect. This retouching material is said to have the advantage of drying without darkening or changing either its tint or degree of opacity, and, by its homogeneity with the deposit forming the negative, permitting greater harmony than can otherwise be obtained where much retouching is required. It is also waterproof, and not easily rubbed off in the course of printing.

In many cases it will be found desirable to apply indications of clouds, &c., at the back of the negative, but in such cases direct sunshine for printing should be avoided. In blacking out a sky where it is necessary to stop out close to the horizon, it is a difficult thing to use paint so as to avoid a hard line. It is better, in such case, to use the plan adopted by Mr. England and some other of our first-class photographers. A mask of tracing-paper is cut to the form of the horizon; the edge is then serrated or jagged, and allowed very slightly to overlap the horizon line. The tracing paper not being very opaque, and the edge not being hard, no perceptible line is formed, if the printing be conducted in diffused light. The mass of the sky can then be stopped out with opaque colour, the tracing-paper serving to graduate it to the horizon. Clouds can be very effectively painted on such tracing-paper masks, and if the sky be not too dense, a pleasing result may be produced.

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* Continued from p. 338.

It is scarcely necessary to repeat that, although defects may be ameliorated, by a careful person, without much artistic skill, yet some skill in drawing, and also some practice in working on the negative, will be necessary to good results, even with the best method which can be adopted.

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ANOTHER CAUSE OF PINHOLES.

The presence of pinholes in the negative is a trouble so annoying, and at times so persistent, that every suggestion tending to mitigate or remove the evil is worthy of earnest attention and careful investigation. Hitherto, the nitrate bath has been generally regarded as the source of the evil. Super-saturation with iodide of silver, the presence of sulphate of silver, of acetate of silver, of oxalate of silver, and other salts, have in turn been found productive of pinholes. But the annoyance is of a very Protean character, and has at times defied every effort to elude it. The experiments described in the following communication from an able and esteemed correspondent, to whom the readers of the Photographic News have been frequently indebted for valuable suggestions, points out another possible source. We have, for years past, rarely used alcohol in the developer, chiefly employing the saccharated sulphate of iron, which largely obviates the necessity for alcohol, so that we cannot at present recall any special experience with its use as bearing on this subject; we remember, however, that in the days of glass positives, an able American writer on the practice of photography—Mr. Gage—expressed a very strong conviction that the addition of excess of alcohol to the developer was a certain source of spotty pictures. We subjoin the letter of our correspondent, and shall be glad to learn the experiences of others, bearing on the subject:—

July 21, 1866.

Sir,—Much has been written about pinholes and other defects of doubtful origin in negatives. I do not profess to comprehend the theories which have been put forward to account for them, but chance has made me aware of a cause which appears sufficient to effect much injury to the film, viz., the decomposition which is produced by the mixture of glacial acetic acid, and of the methylated alcohol, generally used by photographers, with the iron developing solution. Either, or both, combined with the protosulphate (under certain conditions) in a test-tube, give a crystalline deposit: why not also upon the plate during development? I enclose a memorandum of the experiments (if they are worth being so designated) which have led to my addressing you on the subject. The inference to be drawn from it is, that this cause of pinholes (if it be one) may be greatly avoided by the use of [pure] alcohol and citric acid, and much mitigated by the use of an iron solution which is neither very strong nor very fresh. As this question may have been heretofore fully considered and exhausted, I leave it to your judgment whether this letter be worth publication or not.—I am, sir, your obedient servant, N.

Protosulphate of Iron. Protosulphate Solution, 22 grains per oz., mixed eight days, a little discoloured, call this the "*Old Solution.*"
" " over 60 grains per oz., freshly made, call this the "*New Solution.*"

1.	Alcohols.	2 drachms of "Old Iron Solution,"	mixed with	1 drachm of Methylated Alcohol	... No change.
2.		2 " "New Iron Solution,"	"	1 " " "	... Deposits greenish crystals at once; in a few hours about three-eighths of an inch in a half-inch tube.
3.		1 drachm of "New Solution,"	"	½ " Absolute Alcohol	... No present change; after two days found a few crystals.
4.	Gl. Ace. Ac.	2 drachms of "Old Iron Solution,"	"	1 " Glacial Acetic Acid	... Becomes brown at once, and deposits crystals about a quarter inch high in the tube.
5.		2 " "New Iron Solution,"	"	30 minims of Glacial Acetic Acid and 30 " Methylated Alcohol	Becomes brown; deposits a large quantity of greenish crystals, say half inch high in the tube.
6.	Citric Acid.	2 " "Old Iron Solution,"	"	2 drachms of Citric Acid Solution (strong, about 240 grains per oz.)	Becomes greenish in tone, but no deposit; after two days the lower half of the liquid becomes clear and transparent, the upper half is greenish still.
7.		1 drachm of "New Iron Solution,"	"	1 drachm of No. 6	... Becomes greenish in tone, but no deposit.
8.		1 " No. 6	"	20 minims of Glacial Acetic Acid	... More deeply green (yellowish green), but no deposit.

Note.—The crystals form at the top of the tube and fall. They are "green" when looked at; but taken out, separately, they are transparent and clear. It should also be stated that my chemicals are fresh and good, and were obtained from an eminent photographic chemist. N.

THE CONSTRUCTION OF GLASS HOUSES.

There are two very important conditions connected with the construction of the photographer's studio, either the one or the other of which is imperative to success in all cases. The photographer must either have efficient means of controlling the direction and amount of light, or he must have a studio in which no such control is necessary. The possession of the latter is not always possible, as it depends on circumstances only occasionally attainable. We have seen such studios in which well-modelled pictures were obtained at all hours of the day and all times of the year without altering a blind. Of course, there may be in such cases some monotony of effect, and although there is a constant average of excellence, every sitter does not necessarily secure the highest excellence, as there is a little difficulty in making the modifications desirable to meet special cases. On the whole, whilst such rooms give the least trouble, we think that those in which frequent modification of the lighting is necessary, with perfect facility for effecting it, are the most satisfactory, and certainly permit the greatest variety of effects.

Of the latter class, a new studio recently erected at New Cross, by Mr. A. L. Henderson, and which we received some weeks ago a courteous invitation to inspect, is a very good example. The essential feature of the studio is a ready and very complete control over the light from a sloping front light. We may mention generally, in passing, the form of the studio. It is on the ground-floor, and about thirty feet long by about twelve feet wide. About one half of the length of the room constitutes the studio, the other half is without illumination, and preserves the camera from diffused light. The greatest height of the skylight is twelve feet, and it slopes down in front of the sitter, having a fall of four feet in the ten feet which it extends in front; the width is about twelve feet. This skylight is fitted with blinds, which give this very complete control over the light to which we have referred. It is afforded by two Venetian blinds, one of which covers the right half of the skylight, and the other the left half, meeting in the middle. The laths of these Venetian blinds are each four inches and a half wide, and can be so arranged as to permit the entire exclusion or the admission of almost any amount of light, and in almost any direction. When one blind is entirely closed, that half of the room is in shadow, and if the other were entirely opened, the strongest contrasts of light and shadow could be obtained; if both blinds were drawn up, a very strong light, and very little shadow would be obtained; but an infinity of gradations is possible between these two effects. By adjustment of the angle at which the laths hang, which is easily done by the cords attached, the amount and direction of the light can be materially controlled: they can be arranged so that the sitter, looking to the blind, can see only the edge of each lath, the light approximating to horizontal light; by a slight inclination it is made more vertical; and by a further alteration it is thrown very much off the face altogether. It will be seen that any of these effects may be produced by one blind to regulate shadow, whilst the other is drawn up entirely to give a strong light; or one may be down, excluding light entirely, and producing strong shadows, whilst the lights are regulated by the other half. This skylight is the principal source of light, but there are large side lights as well, provided with similar blinds. These side lights, however, to meet the exigencies of privacy, where the studio, being on the ground-floor, could be overlooked on each side, are glazed with corrugated glass, and will admit a soft light, which can never be dominant, whilst any portion of the skylight is uncovered.

The studio is fitted with various other ingenious contrivances to secure convenience, prominent amongst which we may mention the background arrangements. Half-a-dozen backgrounds of various kinds, stretched on frames, are constantly ready for being brought into use with the least possible trouble. They rest in a sunken recess or well, duly provided with grooves, and, by pulling a cord, each one may be brought into position behind the sitter at a moment's notice. This, and various other convenient arrangements, make the studio at once convenient and efficient. Mr. Henderson is an active and intelligent photographer, to whom photographers generally are indebted for more than one useful hint, which has been given so modestly that they have not known from whence the hints originated. We may mention, first, the preliminary bath of acetate of soda before toning, by which so many photographers were rescued from the plague of mealiness, then very prevalent; and second, the use of nitrate of soda in the printing bath, which has been found so efficient by many, in using weak silver solutions.

Whilst on the subject of glass-rooms, we call attention to an interesting article, on another page, on the subject, from our able contemporary, the *Philadelphia Photographer*, who has recently given much attention to the subject.

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PHOTOGRAPHY CONSIDERED AS A PROFESSION.

BY JABEZ HUGHES.

No. I.—Preliminary.

Photography, like genius, may well be described as many-sided. Its different aspects have been described in treatises and manuals, in papers read before societies, in the able editorial leaders of the photographic journals, and in voluminous correspondence. There is one phase, however, that has had little public ventilation—as a means of obtaining a livelihood. Perhaps this aspect is one that is the least fitted for such discussion; yet, considering its universal diffusion—for there is not a part of the civilized world where it is not practised for profit—there must be many points of common interest among those who are so vitally interested that admit of public consideration. It is now some five-and-twenty years since men began to earn their livelihood by the practice of photography, and although many have fallen from the ranks, yet the foremost man, Mr. Claudet, is still spared to us, and long may he remain with us, for no one has shed such lustre on professional photography as he has done. Many other honourable names might be mentioned, in London and the provinces, who are almost as experienced veterans; but the vast majority have come but recently amongst us, as the great popularity of our art dates from Archer's important discovery of collodion.

Though professional photography has existed sufficiently long for a generation to have arisen who have practised nothing else—and there are many who have known no other pursuit—yet the bulk of persons who follow it have been brought up to other means of obtaining a livelihood. There must be some singular facility for adopting photography, for there is not a trade or profession but has contributed to professional photography. It is singular, also, to know the many-sidedness of our art, for whatever a man has been brought up to, he finds that he can make that knowledge useful in his new profession. Although the business has become so thoroughly established as a business, and though the practitioners have become so numerous everywhere, yet it has not become so consolidated as to have an *esprit du corps*. One photographer is not attracted to another, *because* he is a photographer, as surgeons, artists, actors, or even carpenters and shoemakers are to each other. In due time this will doubtless come.

It is singular to note, that though all trades and professions have contributed to form photographers, yet it cannot be said that any one in particular is *the* one, as being the best, as a preliminary training. Many men, who have failed at all other things, have found in photography just the very groove for which they are fitted. Such men, after being for years a trouble to themselves and a plague to their friends, have eventually retrieved their character, and won, not only golden opinions, but something else golden of a more substantial nature.

Some of the most brilliant and clever men have not been the most successful. In photography, like many other things, the race has not always been to the swift, nor the battle to the strong. In speaking of "success" in connection with professional photography, I do not merely mean the production technically of excellent photographs. Many men have, in their time, done capital work, and yet eventually have gone to the wall, and even to the dogs. I have no faith in what is often miscalled genius, as connected with the professional photographer, but I have strong reliance on common sense and common honesty. If these be united with industry and prudence, success must eventually follow. Success, commercial success, is what every man should aim at obtaining by the exercise of his calling. To be able to produce good pictures is an excellent ambition, but to pay your way and have something to fall back upon is a better. What I understand by a successful professional photographer is, one who establishes a business by his own exertions; who gradually and steadily acquires a good name among his customers for his desire and ability to please them; who honestly tries to turn out good work; who employs skilful assistants, and pays them as well as he can afford, and is kind to them if they attend to their duty; who attends to his business and pays his debts in a regular manner. If a man does all this—and why should he not?—and lives within his means, such a man is as sure of commercial success as that the sun will rise the next morning. And if a man does not do this, though he may go on swimmingly for a time, he can place no reliance on the future. Some men believe strongly in advertising; others rely on cheapness; some say the public is gullible, and must be humbugged: there may be some small grains of truth in all this, but my certainty is in a steady reliance on straightforward duty.

These remarks are made in connection with professional photography, because, by the disregard of them, many men, otherwise good photographers, have come to grief through relying merely on their good work and temporary prosperity, and thus they have not only injured themselves, but brought discredit on the fraternity. Some time since, I met a friend whom I had not seen for a few years. After the usual salutations, he said, "What are you doing now—not in photography?" "Yes I am; why do you ask?" "I thought you had left that; I always thought you aimed at being something respectable!"

Professional photography is now passing through a crisis, which may eventually do it great good, by weeding out a low and disreputable class, who got into it in the glass positive days. At its early period of Daguerreotype—its infancy—it was a respectable vocation; but it led a riotous life during its glass positive youth; the company it kept was very disreputable: it is shaking them off now, and let us hope it will regain the good character it had during its infancy.

It has already been mentioned that the ranks of photographers are chiefly recruited from individuals who have previously followed some other pursuit; and it is curious how those previous influences modify the professional career of the photographer. These influences, though very varied, often give a decided bias to the individual. Thus, some who approach photography through the legitimate direction of art, view it as a vehicle for artistic expression; others, with a more scientific training, have a leaning to the optical and chemical aspect; others view the whole affair as merely mechanical; and a considerable number look only on it as a means of getting bread and cheese.

Thus, photographers have their proclivities and specialities. It is sufficient to merely note these now, as they may be referred to hereafter; but enough has probably been said to show that, considered as a profession, it is a fit subject for consideration.

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ON THE PREPARATION OF CRAYONS FOR ENLARGEMENT, COLOURING, ETC., ETC.

BY A PRACTICAL MAN.

CRAYON is the general name given to various vegetable and mineral substances used in designing and colouring, whether beaten and reduced to a paste, or used in their primitive state, after sawing and cutting them into long narrow slips. In this way red crayons are made from red chalk, white from white chalk, and black from charcoal and black lead, and in the early days of crayon painting comprised all that were used by Lawrence, Hoppner, Kauffman, Bartolozzi, Harlow, and others, Challon being about the first of any note who led the way with a greater variety of coloured tints. All coloured crayons are compositions of coloured earths reduced to paste, and the tempering of the same is an operation requiring much skill and nicety to avoid, on the one hand, their being so hard as to impart an insufficiency of colour; or, on the other, so soft as to crumble away, and leaving little but coloured dust upon the paper. Various slightly glutinous fluids are used to give them the requisite degree of coherence, but the strength and the kind of fluid used requires to be varied according to the nature of the colour employed. Among a variety of substances used for the purpose, and generally considered about the best, is *ale wort*, rendered glutinous by boiling, and gum tragacanth.

As all the marks made upon the paper by these compositions can be but slightly attached to the same, they are very liable to be injured and defaced; and various means are resorted to for *fixing* them, so that without injuring the tints they may bear rubbing. When the chalk picture is made on unsized paper, it should, on completion, be carefully laid, chalk side downward, on a sheet of thick blotting-paper, and the back brushed over with a solution made by boiling two drachms of isinglass with one drachm of powdered alum in a pint of soft water, and then straining the same. It should be applied milk warm, and will be found to penetrate the paper and effectually set the picture.

Crayon drawings done on sized paper may be treated as follows:—Take a piece of thick blotting-paper, the same size as the picture, and lay it on a clean table or other flat surface, and then, with a sponge dipped in the luke-warm composition of isinglass and alum, go over the same till evenly and completely wetted; then press the face of the chalk drawing evenly and gently on the same, when the chalk, becoming wet with the size, adheres to the original surface, and, by carefully avoiding the least side-wise motion while the two surfaces are in contact, the colours are not in the least injured by the minute quantity transferred to the blotting-paper.

Chalk drawings may also be fixed by dipping them in strained milk from which all the cream has been removed, and then carefully drying them.

Sebastian Grandi, an Italian, skilled in the preparation of colours for artists, communicated to the Society of Arts a method of preparing crayons which, while taking but little from their original brilliancy, gave to them the desirable property of self-fixation, thereby preventing their being rubbed off the paper when used. They are made of bone-ash powder, mixed with spermaceti, adding to the same the necessary colouring matter, according to the tint required, the proportion being one ounce and a half of spermaceti to half a pound of the coloured bone-ash. The spermaceti is first dissolved in boiling water, when the whole composition is ground up into a paste, rolled into form, and dried upon a board.

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A NEW DARK TENT.

BY B. J. EDWARDS.

[OUR attention has recently been called by Mr. Meagher to a new dark tent he has made, according to the designs of Mr. Edwards, which possesses, in a high degree, the qualities necessary in a portable dark-room. It is extremely light and portable; very convenient to work in; well lighted and ventilated; easily kept clean; very simple in construction, and easily erected. It is not patented, but placed at the service of photographers; it is probable, however, that it will be manufactured more perfectly, and at a cheaper rate in numbers, by Mr. Meagher, under the instructions of Mr. Edwards, than it could be done under other circumstances. Mr. Edwards has, however, furnished us with a detailed description, which we place before our readers.]

Until the discovery of a really perfect dry process, any arrangement which will facilitate the working of wet plates in the field must be considered worthy of attention.

Various ingenious contrivances have been from time to time introduced to serve the purpose of a dark room for outdoor photography.

The new tent will be found to combine, in a high degree, the qualities which a portable operating room should possess; *i.e.*, lightness, portability, ventilation, and comfort in working.

In general form, the tent is somewhat similar to several of those now in use, but the various parts, some of which are quite new in principle, have been designed to meet wants ascertained during a long course of practical photography in the field.

The body of the tent consists of a rectangular box, about 24 inches long, 19 inches high, and 6 inches wide, when closed being about the size of an ordinary portmanteau; when required for use the tent is fixed on a tripod stand, and the front or lid falling down on hinges, forms the developing tray of the above size, 24 by 19.

The bath drops into an opening in the bottom of the tent, and the light-proof covering being thrown over the iron supporting frame attached to the tent, a plate may at once be coated and immersed in the bath; the collodion and various developing and fixing solutions being permanently arranged in order as wanted, each in its own recess in the tent, thus requiring no other packing, except being replaced when used.

Abundance of light is obtained by a large window of ruby-coloured glass, so arranged as to admit white light when required, and having the glass protected by a hinged shutter when travelling. Ventilation to any required extent is secured by means of a sliding shutter in the top of the tent, the opening being covered and protected from light by the water cistern, to the bottom of which an admirably contrived system of ventilation is attached.

The efficient ventilation of the tent is an important feature (which will be appreciated by those who have worked large plates in a close tent): plates of 12 inches by 10 may be coated without the slightest inconvenience from the fumes of the ether and alcohol in the collodion.

The cloth covering is made loose from the tent, in order that it may easily be shaken to prevent the accumulation of dust which would otherwise take place; it is also advisable, in hot weather, to wipe the covering on both sides with a wet sponge before erecting the tent. With the exception of the covering, which is attached in one moment, there are no loose pieces.

The light iron frame which supports the top is, by a novel arrangement, made self-supporting, and extends sufficiently to allow plenty of room inside the tent above the head of the operator.

In addition to completeness of the minor details, a great advantange in the new form of tent is the extraordinary facility with which it can be erected ready for use in a few seconds, thus avoiding loss of time to the professional landscape photographer, and offering to amateurs a perfect substitute for a dark room.

A convenient portable levelling stand, for use in the tent, consists of a small metal frame or stand (similar to a folding camp-stool), with three levelling screws, and clamping screw in centre; it is arranged to serve for large or small plates, is very strong, and occupies an extremely small space when closed.

ON THE PHOTOGENIC MATERIAL OF THE PURPLE OF THE ANCIENTS, AND ITS EMPLOYMENT IN PHOTOGRAPHY.

BY M. PAUL FASSY.

The subject of the "Purple of the Ancients" has greatly occupied the attention of naturalists, and M. Lacaze-Duthiers has published a report on the subject full of the most interesting enquiries and facts. M. Grimaud de Caux has also occupied himself in the study of the same subject, from which works we are enabled to give a summary view of this interesting matter.

The ancients attached great value to purple colour; it was the emblem of royalty, and purple robes could be worn only by the privileged. The dye was valued at the rate of its weight in silver.

But modern chemistry enables us to dispense in dyeing with the costly ancient dye. The marvellous results opened up by the aniline dyes have led to the superseding of most of the costly pigments, so that the ancient purple is now regarded as little more than a curiousity, and the only use to which we find it applied is as a marking ink for linen, as it is almost indelible; but its property of being colourless when sheltered from light and air; of oxydizing; and, upon exposure to light, acquiring splendid hues, varying from yellow, blue, rose, violet, to the most intense red, has led M. Lacaze-Duthiers to aim at applying it to photography.

The processes he employed—by the aid of which he obtains results, a specimen of which is before us—are as follows:—

Upon breaking the shell either of the *Murex brandaris* or of the *purpura lapillus*, and opening the body of the mollusk inhabiting it, we find a band of a whitish tint, and frequently of a very light yellow, placed in the lower surface of the mantle, between the intestine and the branchia, nearer to the latter than to the former, scarcely further advanced than the anus, and reaching at farthest to the point where the mantle arrives in contact with the *corps de Bojamus.* This is the gluey matter of the *yellow band*, which, upon removal, furnishes the purple matter. A stiff, flat brush is employed for the purpose, by rubbing the part in which the pigment is secreted several times. The brush soon becomes charged with a viscid, fibrous, adherent substance, with which the tissues to be coloured are coated either by a circular or an alternate motion from left to right, &c., which at first produces froth, but soon forms only a liquid, rather thick, but from which all the air-bubbles gradually disappear. To produce a uniform coating of the fluid, the surface of the tissue is gone over as many as four times. A band of white silk yields very charming results.

It is scarcely necessary to add that for photographic purposes this operation must be conducted in a dark room.

Exposure in the sunshine under a negative is necessary to obtain a positive, but the time is infinitely longer in obtaining a proof in the camera by the simple action of diffused light. M. Lacaze-Duthiers has, however, taken the picture of an object upon which the direct light of the sun was thrown by means of a mirror. The time of exposure to obtain a picture in the camera varies with the intensity of the light, etc. In the middle of August, in a good sunlight, four to five minutes sufficed, but pictures have been obtained in two minutes.

In order that the purple may pass successively through the hues indicated, it is necessary that it be continually mixed with a given quantity of water. After spreading the piece of tissue upon the plate bearing the negative, it is well to moisten it with some drops of sea-water, then to apply a piece of stuff, also moist, folded many times, and cover the whole with a second plate, and expose it to the sun. When the heat is great, the precaution must also be taken of adding some drops of water, in order that the contact of the pieces covered with the purple material remain constant and perfect. Unless this is done, the tissue separates a little from the negative plate, bubbles of air form, and injure the purity of the picture.

Upon adding the water, we can examine the back of the tissue, and judge of the state of development of the colours and tones. To succeed in obtaining strong shades, the exposure must generally be arrested when the parts which should be white in the pictures obtained by ordinary photogenic agents present here a beautiful greenish yellow tint. If the green be too deep, the violet hues invade everything, and the yellows have no longer sufficient contrast with the violets representing the blacks, which are not so deep in proportion. In the pictures thus obtained, we find the blacks replaced by a violet, or a bright red hue, according to the species of *Murex* employed, and deep in proportion to the facility with which the light has passed through the negative. These hues are successively graduated in passing through the scale of yellow and green, as stated above, according as the blacks are more or less intense in the negative. For this reason, in order to obtain positive proofs, it is as well to select negatives with the lights and darks well contrasted.

The hues and the reflected lights presented by these photographs are very agreeable, and in the picture of the head of an old woman, the pale yellow hue of the lights exactly imitated the flesh tints of old age. Besides, there was harmony of contrast of colour; yellow and violet being complementary to each other.

Without doubt, with the species which yields a large quantity of the purple, we may obtain more readily an equal and uniform coating of the fabric, for in collecting the sensitive material from several small specimens, like the *purpura lapillus*, an inequality in the sensitive coating is often remarked, the consequence of the intervals of time occurring in the collection. It is, in fact, very difficult to continue the spreading from the exact point at which we left off; and then the juncture is more or less prominent, according as there is more or less mucus. The pictures on paper have infinitely more vigour and detail; but there is the difficulty of the impossibility of spreading the purple upon it with the stiff brush. M. Lacaze-Duthiers has spread it with his finger without rubbing too hard, so as to avoid removing the glaze from the paper.

The question to be considered is, to what uses can the purple of the *Murex* be applied.

The manufacturers of chemical products are daily throwing into the arts a torrent of products which, with the greatest facility and perfection, serve as the richest and most delicate dye-stuffs; and we can scarcely hope to see the colouring matter of the *Murex*, although yielding very beautiful and permanent colours, employed in the arts on a large scale. Photography may, however, derive some advantages from its photogenic properties, and obtain, for example, on screens, fans, and the numerous articles of fancy which are the pride of French industry, exquisite results of true artistic value.

By combining portraiture with certain sympathetic inks—as nitrate of cobalt, which appears rose-red when exposed to heat, this colour disappearing upon cooling—we may produce charming hand-screens, medallions upon white silk richly framed, besides scenes copied from the works of the great masters, landscapes from nature, which, reproduced with the facility and fidelity of the Daguerreotype, will find applications in album-covers, portfolios, pocket-books, &c. Calico-printing, even, may find a new source of success in this branch of photography. The design appears to retain its clearness and sharpness, whichever surface of the fabric be examined, and the purple never fades. Besides, it cannot be attacked by boiling saturated solutions of soda and potassa, nor by acetic, hydrochloric, and sulphuric acids. Nitric acid alone destroys it.

As to solar light, the veritable foe to all colour, the object of fear to artists and the fair sex, it cannot revive the colours without altering them, as it is one of the integral parts of the effect obtained, under solar influence, the pupurigene liquid being oxydized by combination with it and the oxygen of the air, disengaging a strong odour of leeks.

The *Murex* is very abundant on the shores of the Adriatic and the Mediterranean, and its cultivation on our own coasts presents no difficulties. The species possessing most colour are the *purpura lapillus* or *haemastoma*; *Murex trunculus*, which yields dark red and violet hues; *M. brandaris* or *erinaceus*.—*Le Moniteur de la Photographie.*

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ECONOMICAL PROCESS FOR PRINTING POSITIVES.

BY DR. SCHNAUSS.

It may be considered as an admitted fact, that the beauty of positive photographs on paper depends not upon an absolute quantity of chloride of silver, but upon the silver found in excess. There do not exist, in fact, any positive researches to ascertain how much chloride of silver, in proportion to the free silver, is required to obtain the finest proofs, and especially if, for a given surface of paper, in observing the proportions of the two salts, we must take more chloride of silver than nitrate.

We may conclude that hitherto we have perhaps used too great quantities of chloride of silver uselessly, or, what amounts to the same thing, we have salted the paper too much. Besides, we have not taken the nature of the albumen into consideration. On account of its tenacity, a very thick coating remains upon the paper after it is dry—a coating that contains a notable quantity of salts, on which account very strong baths of nitrate of silver have been prescribed.

We have also completely neglected to take into account the chloride contained naturally in the albumen dried upon the paper, a quantity by no means insignificant, since, according to Poleck, it contains more than one half of one per cent., a quantity in itself sufficient to produce the chloride of silver necessary for a copy, requiring then only a small quantity of nitrate of silver for this salt to be in excess.

I wish to give, in this place, the exact proportions of white of egg, such as it is constituted (according to the researches of Poleck) in the formation of the sensitive coating. Dried albumen contains 3·042 per 100 of soluble ashes, and if we reckon how much chloride, in all, the dried albumen contains, we find it to be 1·53 per cent.

A very important moment in the new method of producing proofs upon albumen is that at which the chemical combination between the albumen and oxide of silver (usually called albuminate of silver) takes place, which, as is well known, very quickly becomes of a brown red colour when exposed to light. In the gold bath, proofs in albuminate of silver tone quickly and well; and, what is a very great advantage, these toned proofs do not lose their vigour in the hyposulphite, and the fixing is quickly terminated. If we employ only the ordinary nitrate in the sensitizing solution, we obtain only weak and unsatisfactory proofs; but by adding another nitrate to the bath (one with an alkaline base in preference), the proofs are greatly improved, and when dry cannot be distinguished from ordinary proofs on albumen. Every photographer should try this new method of printing, and many, I am convinced, will adopt it; for not only do the manipulations remain unchanged, but the usual intensity of the negatives suffices, and this process does not require—like the Wothlytype, for example—an extraordinary intensifying of the negative.

To distinguish this process from the ordinary one, we may name it the "albuminate of silver" process, even though the chlorides present play an essential part in the operation; for we cannot separate the chloride from the natural composition of white of egg, and therefore we cannot admit that they are proofs formed with pure albuminate of silver.

The following formula has given me the best results hitherto:—

Distilled water	20 ounces
Nitrate of potassa...	1 ounce
Nitrate of magnesia	1 "
Nitrate of silver	140 grains.

Each of these salts must be chemically pure, for, considering the small quantity of silver employed, an excess of salt in the potassa or magnesia will be inconvenient. The nitrate of magnesia, which does not crystallize, is added to diminish the too ready crystallization of the nitrate of potassa, which might interfere with the success of the operation. We can sensitize, comparatively, a greater number of sheets upon this bath, without strengthening it, than upon an ordinary bath. Besides, one's own experience, and the tone of the proofs, will be the best guides.

The proofs must be printed strong, but not more so than customary. They colour readily in the gold bath, and, as usual, all the tones desired may be obtained; and according to the strength and alkalinity of the gold bath, as well as the time occupied in toning, the scale of tones is from chocolate-brown to blue-black.

An important advantage (as already remarked), of the proofs in albuminate of silver is, that they do not at all change in tone in the hyposulphite solution, as is usually the case in the old method, and which is the cause of great embarrassment and annoyance, for the operator can never tell what tone his proofs will assume in the fixing, although they were quite satisfactory in the gold bath.

Many persons believe that the albuminate of silver in the ordinary method cannot be completely removed by the fixing operation—that it retains a portion of its silver—and that, consequently, we cannot reckon on the permanence of the proofs. This reproach does not apply more to our new process than it does to the old one, for in both one and the other we have to do with reduced silver, and the whites contain unchanged albuminate of silver. I have not yet experimented upon proofs in albuminate of silver, exposed a long time to the sun's rays, with a view of observing the effect; but from what I have said, the excess of salt being not so strong, they may present a sure guarantee of permanence.

The manipulations of my method are naturally the same as in the old process, which is not one of its least advantages.

In sensitizing the paper it sometimes happens, as in the old process with salted albumen paper, that the liquid, in drying, collects in places in drops; but with cleanliness and care this inconvenience may be readily avoided.—*Photographisches Archive.*

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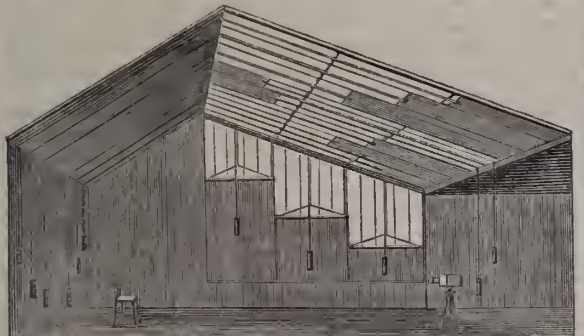
AMERICAN GLASS HOUSES.*

More and more interest seems to be taken in the construction of the glass-house as our art progresses. How to secure the best mode of lighting the model, and how to construct the atelier, have become quite as important questions as what lenses or collodion or developer are best? The idea that any room with a top or side light in any convenient locality and direction is good enough for making pictures is becoming emphatically exploded, and there is a growing desire among artists to find out the best way to construct their lights in order to secure the best results. So much has been said and written about it, that we can hardly promise anything new, yet we have so many applications from parties who have been awakened, for instructions, that we cannot see that it will be out of place to record a few hints upon the subject.

The thing of first importance is to select the locality for the glass-house. This should be done with much care, and well considered before any decision is made. We should not disregard the fact that the *quality*, and not the *quantity* or *intensity*, of the light, is the great requirement to be sought for. A strong light produces unpleasant and inartistic shadows, and contracts the features of the model. Consequently, the direct action of the sun's rays should generally be avoided. Only a practised hand and a truly artistic eye can manage such light to produce good effects, and these qualities are not possessed by most of us, we fear. Care should be taken to secure a proper elevation for the glass-room. The "first floor" principle adopted in some of our cities is a wrong one, unless the buildings on each side are low. No neighbouring tall buildings should be allowed to interfere and exclude the light on either side. The horizontal light is needed to enable us to make quicker exposures, and to obtain easier access to the light.

Though the sitters may complain of having to climb so many stairs, we can promise them better pictures, if they will "come up higher." We know of two rooms in our city, almost foot for foot the same in size. One is a story higher than the other, and of course, in the higher the best effects are obtained.

Having, then, secured a proper place, how shall we build the glass-room? One part should be open to the north, another to the east, a third to the west, and the south side should be closed. In many cases it will be found impossible to have a side light; but if this be so, care should be taken that the inclination of the top light is toward the north. It would be better to elevate the room, even a story higher, to get one side light at least. It will make all the difference in the world to your sitters. In fact, it is almost a necessity that the model should face the north, in order that there need be no contraction of the features by a too powerful light. Even should a dark wall be on the north side of the room, the sitter should face it, or nearly so, and the south should be the dark room.



Below is a diagram of the glass-room of one of our best photographers, Messrs. Henszey & Co., 812, Arch Street. We think it compares very favourably with any light in our city, and we consider it one of the very best arrangements, and a safe model to go by, in constructing a glass-room. Although in some respects the same, the inside arrangements are different from the one described in our December number, and it is lower. The view given of it is from the east side, thus showing the arrangement of the top and one side. Of course, then, the side we see is the west side; by the chair we see where the model is placed, and the camera and stand, point out the space near which they are used. The dimensions of the room are as follows:—

	Ft.	In.
Width of side light	13	0
Height of side light at the lowest point	6	10
Height of side light at the highest point	11	9
Distance from the floor to the bottom of the side light ...	0	14
Width of the top light	17	6
Length of the top light	15	0
Depth of the room as shown in the diagram	32	0

It will be seen that instead of blinds, curtains or shades are used to modify the light, both at the top and on both sides. By a proper arrangement of weights, pulleys, &c., they are made to change the light as the operator may desire. If the light be too strong from the direction of the top or side, the curtains are drawn so as to soften the shadows, and secure such relief as is found requisite. These curtains may be raised or lowered to any extent; so it will be seen that by their use almost any modification of light may be secured. They are made of blue muslin, and therefore admit only the kind of light needed. Experience must teach the proper use of them. On days when the sun shines directly upon or in the room, the whole of the curtains should be used, and at other times they are arranged as they appear in the diagram. Now, to prevent the illumination being too great on the side of the model next to the light, a white screen is placed on the other side, in order to reflect the light in the direction desired. A screen covered with silvered paper is sometimes used, and occasionally a mirror for the same purpose, but we are inclined to think the white screen of muslin or paper would be the best. Blue screens are sometimes used for a like purpose. It will be understood that in posing in such a light as this, care should be taken that the light does not fall upon the sitter vertically. This may be prevented by the use of the curtains. The rays of light should have a certain inclination, as it were. In the diagram the chair has been placed by the engraver rather too far back, or more so than it is usually used. It has been suggested that another window be added to the side light, in order to secure a light between the sitter and the background. We think this would be a great improvement, and add much to the softness of the picture. *This lighting from behind* is practised in Germany, we believe, and is one of the secrets of the success of those beautiful Berlin cartes noticed by us some time ago. * * * In closing this part of the subject, we would add, that there is more *art* in *lighting* the model than most are willing to concede. A mild, soft light is what is required. A strong illumination produces shadows of great intensity, and often contracts the features of the model. This is why some people complain that their pictures make them look older than they really are.

This room being a wide one, it is divided into two apartments by a large curtain hanging from the roof to the floor. Either or both sides may be used at pleasure. One model will require an east and another a west side light. In the morning the east side of the room must be shaded, and in the afternoon a similar change must be made on the west side. * * * The unglazed portions of the room should be painted or papered with blue or some neutral or grayish colour. In Messrs Henszey & Co.'s light, blue is used of a rather light shade.

It is often asked, what kind and size of glass is best to use? As to size, much will depend upon the size of the building. Glass in as large pieces as practicable should be used, as less light will be interrupted by framework. In the diagram it will be seen that the framework is made so that the glass may be arranged in rows, the pieces overlapping each other. A good strong window glass is good enough, though crystal glass is better. Blue frosting is almost universally used to colour the glass, and can be highly recommended. It gives free passage to all actinic rays, and enables the artist to place his model with great advantage. The curtains described above are also used with the blue-frosted glass, as at certain times of day they are needed. In placing this blue frosting upon the glass, great care should be taken not to get it on too thick. It should not be painted, but *stippled* on. To do this, take a large paint-brush, and wrap it with twine to within two inches of the end of the bristles. Dip the brush in the frosting, and carefully and uniformally stipple it on to the glass. This requires patience and care, but it amply repays for the trouble. Ground glass should never be used, as it absorbs to a very great extent the chemical rays of light most needed in photography, and at the same time allows too much bright light to pass. One of our eminent photographers (Mr. Gutekunst) some time ago took great pains, and went to great expense to have ground plate glass put in his top light. It was but a short time before the ground glass was displaced, and the blued substituted. A short time ago Messrs. Henszey & Co. removed the blue from their top light, and attempted to use the plain glass. The blue frosting was replaced in about a week afterwards. It is now being almost universally used in our city.

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* *Philadelphia Photographer.*

During certain seasons of the year the light from the south shines too directly upon the roof of the glass room. This is overcome by wooden screens placed upon the roof, and so arranged with block and tackle that they can be raised and lowered at will.

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NEGATIVES FOR ENLARGEMENT.

BY DR. VAN MONCKHOVEN.*

The perfect transparency of the negative in the shadows is the first essential. The collodion, silver bath, and developer may be any that give good results in ordinary working.

The sensitized plate should be exposed in the camera a little longer than usual. The object of this is evident. Were the plate given the usual exposure, the developer would bring out the details to the shadows only after a considerable time (nach längerer Zeit), during which time the high lights could become too dense. But by the longer exposure, the details in the lights and shadows are got at once. Therefore, in developing, the operator provides two vessels, one containing a sufficient quantity of iron developer, and the other a supply of water. The iron solution is so poured on as to wash off the bath solution. In a word, the author remarks, I shall best express my idea, by saying that the plate is *washed with developer*. The picture appears, and the moment that the details appear on the shadows, the water is applied, and the plate is well washed, and fixed with cyanide of potassium.

The essential part of the operation consists in getting the developer off before any veiling takes place (five or six seconds are generally the time required), by means of an energetic stream of water, and the use of cyanide instead of hypo.

The dry negative, examined by daylight, should show the details in the shadows as scarcely visible. The dense parts must be so thin that one can read through them, and see the smallest objects, otherwise the enlargement will not be satisfactory. What is most of all to be avoided is veiling; this is worse than too great density.

Negatives that are too strong are best reduced by plunging into a bath of one grain perchloride of iron to each three ounces of water. Then wash and dip in cyanide, and the strength of the negative will be found diminished; if not sufficiently, the treatment can be repeated; the length of immersion will vary from a few seconds to several minutes.

No sort of varnish, and not even gum-water, is to be applied, both because the heat would cause these to ruin the picture, and because varnish destroys some of the fineness of the image.

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PHOTOGRAPHING AN ARCHED CEILING.

The *Philadelphia Photographer* describes a photograph recently made by Mr. L E. Walker under somewhat difficult circumstances. The subject was a fresco in the interior of the Capitol at Washington, forming part of the decoration of the dome. The result is described as very perfect indeed. Here is Mr. Walker's description of his operations :—

"The picture is one hundred and seventy feet from the floor of the rotunda whence the photograph was taken; is sixty-five feet in diameter, with a curvtaure of twenty feet. The windows in the dome are eleven feet from the edge of the painting, and three feet above it; consequently, little or no light is received from them. The light proper comes from the windows in the drum of the dome, forty and eighty feet below the fresco, and is consequently diffused and weak. Thus much for the picture and its position.

"When about to photograph it, my first care was to construct a proper stand whereon to fix the camera. This was made of four pieces of scantling, about seven feet in length, united in quadrangular form by narrow strips of boards. A sectional view is enclosed. Inside this stand, to the top and middle rails of one side, was fastened a board, about five feet in length, and perpendicular to the floor. To this was firmly screwed the camera, with ground glass, when in focus, about six feet from the floor. Thus arranged, the front lens of the instrument was pointing to the ceiling in proper position for work. The lens employed was a Dallmeyer portrait—back focus of eighteen inches, and designed to cover a plate 15 by 15. Size of stop, one and three-fourths inches. Time of exposure, from fifteen to twenty minutes. Collodion, ordinary view or portrait. Developer: protosulph. iron, 1¼ oz. to 16 ozs. water; about one-sixth in volume of acetic acid, or just sufficient to cause it to flow evenly, and sixty drops of sulpho-gelatine, made after Dr. Thompson's formula (¼ ounce gelatine to 16 ounces water). I have never yet become an enthusiast in the use of gelatine in development, but believe, if properly used, it is very useful. If one acts on the principle, a 'little being good, much must be better,' he will meet with sad disappointment. Used in moderation, as the subject, the collodion, and state of silver bath require, it will be found a valuable assistant. If at any time reinforcing be required, I add a little larger proportion of gelatine to the iron, and much prefer it to pyro. It can be managed equally well with the latter, and has the triple advantage of not requiring the negative to be washed before re-development, not loosening or making tender the film, or so permanently staining the hands."

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Recent Patents.

MANUFACTURE OF COMPOUNDS OF PYROXYLINE.

BY ALEXANDER PARKES.

This specification contains further improvements in the manufacture of Parkesine, and describes new solvents for and compounds with pyroxyline. It is as follows :—

This invention has for its object improvements in the manufacture of Parkesine, or compounds of pyroxyline, and also solutions of pyroxyline known as collodion. The materials now well known as Parkesine consist of pyroxyline dissolved in or softened by solvents, and usually mixed with colouring matters, oils, and substances which control the inflammability of the pyroxyline.

In manufacturing Parkesine on a large scale in accordance with the specifications of former patents granted to me, and when manipulating large masses of material, I have found considerable difficulty in the employment of the volatile solvents hitherto used. By the present invention I am enabled to produce large masses or quantities in a much better condition, in a shorter time, and with less solvent in proportion to the pyroxyline than is possible with the solvents hitherto used. According to my present invention, I employ as solvents of the pyroxyline in this manufacture nitro benzole, aniline, and glacial acetic acid; when these solvents are employed, the Parkesine can be worked freely in the air; or these solvents may be used in combination with other solvents. I also, according to my invention, render the ordinary volatile solvents more suitable for use by the addition of camphor. By this means I obtain to some extent the same advantage as by the use of a less volatile solvent. Nitro benzole and aniline are not rapidly volatile except at a high temperature, and this property enables me to employ them alone or with other solvents with very great advantage, as the dissolved pyroxyline and its combinations can be worked in rolls and by calendering or spreading machines with great facility, not drying too rapidly, which enables me with facility to coat telegraph wire, or make masses or sheets, or to spread the combinations on textile or other fabrics to produce waterproof cloth for garments or other articles of any size or colour; and the same advantage I obtain when I employ aniline, camphor, or acetic acid, and the combinations, especially those made with nitro benzole or aniline can be worked freely in the open air. When using nitro benzole, I prefer to prepare the commercial nitro benzole by distilling it off hydrochloric acid or chloride of calcium, say six pounds of either to the gallon of nitro benzole. By this treatment the nitro benzole of commerce is rendered much more pure and sweet in odour for my purpose. The following is the manner in which I prefer to proceed in producing Parkesine according to this invention:—I take 100 parts of pyroxyline and moisten it with the ordinary solvent—by preference, naptha distilled off chloride of calcium, as is described in the specification of a former patent granted to me, and as is now well understood—and I press out the excess of solvent by a hydraulic press. I then add the other solvent in the proportion of from 10 to 50 parts of prepared nitro benzole or aniline; or I add 10 to 50 parts of camphor; then 150 to 200 parts of vegetable oil: I use cotton seed or castor oil by preference. This mixture I grind in rolls, which are by preference warmed by steam admitted into them; the grinding is continued until all is well combined as a dough or paste, which will be more or less stiff according to the quantity of solvent employed. This preparation, when made to a suitable consistency, and by preference with nitro benzole, I can employ for coating telegraph wire, by placing it in a closed vessel with suitable apparatus for passing the wire through, as is now practised in coating telegraph wires with gutta-percha; and I force out the Parkesine on to the wire in the usual way, either as one coat or a series of coats. Gums, resins, and bituminous substances may also be ground in and incorporated with the other materials. In making Parkesine with these new solvents, the proportions of materials are varied as heretofore according to the degree of hardness required. I will state that for the hard compounds less oil is used than pyroxyline, and that for the more flexible or softer compounds more oil than pyroxyline is employed, say from 150 to 200 parts of oil to 100 parts of pyroxyline. Nitro benzole and aniline are solvents of gutta-percha and india rubber as well as of pyroxyline, gun cotton; thus, by means of these solvents, I am enabled to employ these and a variety of other gums and resins in the manufacture of Parkesine better than by the solvents heretofore used; and I find a compound of 100 parts gutta-percha or india-rubber softened by or dissolved with nitro benzole or aniline, with 100 parts of pyroxyline, to make a good insulating material for telegraph wire, and it can be put on the wire in the way usually adopted with gutta-percha.

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* *Philadelphia Photographer*, from *Photographische Correspondenz.*

In making Parkesine with glacial acetic acid, I dissolve 100 parts of pyroxyline in more or less of the acetic acid; if for a stiff paste, 50 parts of acetic acid will be sufficient; for more fluid compounds, 100 to 300 parts or more of acetic acid may be used: other substances—such as gelatine dissolved in acetic acid, gums, resins, and others—may be added, as heretofore practised in manufacturing Parkesine.

In the manufacture of collodion, also, I dissolve pyroxyline in nitro benzole, aniline, and glacial acetic acid. Collodion so made is useful as a varnish, and that made with nitro benzole and with aniline is suitable for photographic purposes, and new effects are obtained by its use. In making collodion, I dissolve pyroxyline in nitro benzole, aniline, or glacial acetic acid, using a larger proportion of solvent to the cotton than I employ when making Parkesine, regulating the thickness by using more or less solvent, as is the practice when making collodion with other solvents. I allow the dissolved matter to stand, or I filter for use. This collodion can be combined with collodion made with other solvents; and for photographic purposes I find it very desirable to use a mixture of nitro benzole or aniline collodion with ether collodion, as by using more or less nitro-benzole, or aniline in combination with ether, the speed with which the collodion dries may be regulated as desired, and collodion thus made will be more easily spread on the plate or other surfaces, so as to obtain a perfectly smooth face, than collodion made entirely with the ordinary solvents.

Having thus described the nature of my said invention, and the manner of performing the same, I would have it understood that what I claim is, the employment of nitro-benzole, aniline, and glacial acetic acid, or either of them, for dissolving pyroxyline, in the manufacture of Parkesine and similar compounds of pyroxyline.

I also claim the employment of nitro-benzole, aniline, and glacial acetic acid, or either of them, in the manufacture of collodion.

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PINE'S TONING PROCESS.

A correspondent of *Humphrey's Journal* has the following:—

Having had numerous inquiries referring to the bright and clear tone of my prints, and as many suppose I use a peculiar toning bath, I send you herewith the secret of their brightness, which is owing to the prints being thoroughly freed from the nitrate of silver before toning. To accomplish this object, I have recourse to the following method:—

I take the prints, just as they come from the printing frames, and immerse them in a solution composed of water, one pailful, common salt, one ounce. The prints are immediately covered with a white powder (chloride of silver), which gives them a foggy appearance. I then lay them, one at a time, on a glass, face upward, and remove the powder by means of canton flannel, wrapped round a wooden roller, a little longer than the width of the print. By passing this roller over the print once, with moderate pressure, the chloride of silver is entirely removed, and the print looks bright and clean. The print is then placed in a dish of clean water, and the operation is continued until all the prints are in the second dish, from which they are placed in the toning bath. I can wash thoroughly five hundred 6½ by 8½ prints in an hour without difficulty.

The advantages of this plan of washing are—

1. Three-quarters of the silver used in printing can be saved, as all of it that is washed off remains in the first dish.
2. The prints are washed *thoroughly*, which cannot be done by placing them in running water.
3. The prints can be toned with one-third less gold than was formerly used.
4. The prints being clean, tone quickly, and do not change colour in the fixing bath.
5. The fixing is accomplished in less time, and is more thorough than when the prints are imperfectly washed.
6. Great economy of water. Six pailsful being ample in which to wash five hundred 6½ by 8½ prints.
7. Mealiness in the prints is entirely avoided.

I use an 80-grain silver bath, and float the paper one minute in summer, and two minutes in winter, and tone with a simple solution of chloride of gold and water, neutralized with chalk. I fix the prints in a bath composed of water, 16 ounces, hypo. soda, 4 ounces. If the hypo. soda be acid, I neutralize the solution with carb. soda. Some may suppose the surface of the paper is injured by rubbing it with the flannel, but such is not the case.

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TO DYE CLOTH WITH A NON-ACTINIC COLOUR.

Our contemporary, *Humphrey's Journal*, gives the following. We may add, that paper treated in the same way is excellent for dark room windows. The colour produced is very non-actinic.

"The material, whether woollen or cotton, is first carefully washed and freed from all impurities; it is then immersed in the following bath:—

Acetate of lead	6 ounces
Water	12 ,,

When thoroughly impregnated with this solution, all excess is pressed out, and the cloth is then allowed to dry; after which it is placed in the following solution:—

Bichromate of potash ...	... 3 ounces
Water	... 2 quarts.

The cloth is then rinsed and dried. A deeper dye can be obtained either by increasing the lead salt in the first bath, or by repeating the operation of drying two or three times."

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WEAK SILVER BATHS.

BY LEIGHTON PINE.[*]

Having had occasion to experiment with weak silver baths for printing, during the past few weeks, I send you the result of my observations and experience, feeling confident that those who try the following formula cannot but succeed in producing uniformly good results.

It is a well-known fact among photographers, that in order to get a rich and brilliant albumen print, the paper must be floated on a silver bath, the strength of which may range from 50 to 100 grains of silver to the ounce of water. It is also well known that paper floated upon a weaker bath lacks depth, vigour, and brilliancy, in consequence of the albumen on the surface of the paper being partially dissolved by the water (the silver in the bath being too weak to coagulate perfectly the albumen).

But few, if any, photographers claim that it is necessary to use baths of great strength, except for the purpose of keeping the albumenized surface of the paper uninjured. That the chloride and albumenate of silver can be formed by a 20-grain silver bath as well as by one of greater strength, none will deny; but as the weaker bath compels us to float the paper a longer time, in order to allow the chloride and albumenate of silver to form (during which time the albumen is partially dissolved, and the brilliancy of the paper injured thereby), weak solutions are generally rejected, and strong solutions find favour in the eyes of all.

But now for the formula. I take a number of sheets of albumen paper, and lay them in a pile, face upward. I brush over them, one at a time, a solution of 95 per cent. of alcohol three parts, water one part. Half an ounce of this solution is enough to cover a whole sheet of paper 18 by 22 inches. The papers are hung up separately to dry. The albumen is thoroughly coagulated, and thus rendered insoluble in water, and the gloss of the paper is improved by the action of the alcohol.

The silver bath is prepared as follows:—

Nitrate of silver	... 20 grains
Water	... 1 ounce.

Dissolve and set in the sunlight until it blackens and clears up (by this operation the impurities in the silver and water are precipitated), after which filter clear; then add a few drops of a saturated solution of citric acid. The first two or three drops of this solution will turn the silver milky, and cause a precipitate. Continue to add the acid, drop by drop, until the bath clears up and the precipitate is redissolved. Then filter again through a clean filter, and the bath is ready for use. The paper is floated from two to five minutes on this solution, according to the temperature of the room and thickness of the paper. A mottled appearance when printing indicates the removal of the paper too quickly from the bath. After silvering, the paper is dried and fumed the usual way. When silvering, shake the dish after removing each sheet, as, by so doing, the top of the silver solution is kept of an uniform strength.

The citric acid in the bath gives depth and vigour to the prints, besides tending to retard decomposition. I have some paper on hand that has been silvered two weeks (but not fumed), which I have preserved by keeping in a brown paper bag, double thickness, with the mouth of the bag turned down and fastened with spring clips (so as to exclude the air), and it is as pure and white as the day it was silvered, and works finely. Paper may thus be prepared ahead; and by not fuming until it is wanted for use, a great deal of paper can be saved which would otherwise be lost.

I find no symptoms of the bath discolouring, though it has been in use for six weeks. I exposed a portion of it to sunlight, until it was completely discoloured, and then added a few drops of liquid ammonia. A dense white precipitate was instantly formed, which settled in about an hour, and left the bath clear. I then added the citric acid solution as at first, and the bath worked as well as when new, from which I gather, that if the bath discolours by long using, it may be cleared by adding liquid ammonia, filtering, and adding citric acid as in the first instance.

When I wish to strengthen the bath—which I invariably do after using—I add to it sufficient of a 40-grain solution (prepared in the same manner as the original bath) to bring it to its previous strength. I have worked the bath down to 12 and 15 grains of silver to the ounce of water, and the results were as good as when the bath was 20 grains strong. Practice, however, will soon determine how weak the silver can be used.

I have now detailed a process, simple and economical, the results of which are as good as the best.

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COLLO-PROTOSULPHATE OF IRON.

Some of our readers, perhaps, would like to have a formula for preparing the iron and gelatine developer in the crystalline form. The following has answered our purpose well:—

Dissolve—

Gelatine	... 3 ounces
Sulphuric acid	... 6 „

When the solution is complete, add carefully and slowly, so as to avoid a great increase of heat, 12 ounces of water. When the solution is cold, throw into it four ounces of *clean* and *fresh* iron turnings, and set it aside. In a week, or perhaps more, the acid will be nearly saturated with the oxide of iron. As long as any gas is given off, the operation is not quite complete. If gas has ceased to be liberated, filter and evaporate the solution to the crystallizing point, and then set it aside. In a day or two a large crop of crystals may be obtained, of a greenish-grey colour, and of rather an unpleasant smell. This is the double compound of iron and gelatine.

Formula for the Developer.

Double salt of iron and gelatine ...	1 ounce
Water...	... 12 ounces
Alcohol	... 4 drachms
Nitric acid	... 12 minims.

You will be pleased with this developer if you try it faithfully; it is a modification of Carey Lea's excellent developer.—*Humphrey's Journal.*

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Correspondence.

THE KALEIDOSCOPE AND PHOTOGRAPHY.

Dear Sir,—The perusal of the two articles on kaleidoscopic photography, in last week's News, induces me to send you the following, and Mr. W. Woodbury will see there is no novelty in the application of photography to the kaleidoscope.

It is now more than fourteen years since I produced negatives of the symmetrical images in the kaleidoscope. My practice was simply to set up the kaleidoscope against the sky or a piece of ground glass, and so balanced that I could turn it at pleasure and fix it in any required position, and so take the negative.

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[*] *Humphrey's Journal.*

In the early days of photography, when we were all compelled to manufacture our own collodion, it struck me some time previous to the date of picture (1852)—and, indeed, this conviction was forced upon my mind on its becoming an established fact that certain colours in the spectrum were very little or altogether non-actinic—that the kaleidoscope was admirably suited for testing collodion, and in this way I always used the instrument in making a new batch.

The coloured glasses put in being carefully selected, so as to correspond with the chromatic spectrum, and in this way trying my collodion in the kaleidoscope, I was able to compound a film that gave me the maximum sensitiveness to non-actinic rays.

I herewith enclose you a specimen of one of the earliest I can find; but I have no hesitation in saying that I did them much earlier than the date of this specimen (1852) on Daguerreotype plates, and also on albumenized glass.—I am, Sir, yours obediently, P. Henderson.

3, *Park Hill, Clapham, July 22nd.*

[The print enclosed is on plain paper, and is an interesting illustration of this application of the art. It seems to us something which ought to be utilized.—Ed.]

PENCILS FOR RETOUCHING.

Sir,—I have read with very great interest the first part of your papers on "Various Modes of Retouching Negatives."

I have often used the soft BB and BBB pencils you name with great effect in touching up distance, &c. Seeing how well these worked led me to think that some pencil might be made which would give at once a clean and perfectly *black* stroke, which would be very useful in putting in high lights, and in touching up pinholes or other minute defects. I also thought that many different grades might be made, and that the manufacture of pencils on purpose for photographers would be a branch of industry worth working. With this idea I went, during my late visit to the North, to the celebrated pencil works at Greta Bridge, Keswick, A. Banks being the name of the firm. I took with me a varnished negative, in order to show exactly what was wanted. The manager of the works seemed at once to recognize the class of pencil which would be required, gave me a few which would be near the mark, and promised to try some experiments on the subject and let me know the result, with a view to my communicating the same to you for the News. I am sorry to state that I have not heard any more from the Greta Mills, so that I suppose the experiments proved to be failures. I send you one of the pencils they gave me, which seems to possess some valuable properties. I hope that before long pencil-makers will turn their attention to this subject, and it may be that your mentioning the subject in the News will induce them to do so.—Yours truly,

Nelson K. Cherrill.

10, *Langbourne Gardens, Folkestone.*

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Scientific Gleanings.

Colour of Light.—Dr. Memorsky and Professor Brucke, in a paper communicated to the Vienna Academy, describe diffuse daylight as strongly reddish, just as gas and lamplight is yellow. The only perfectly white light, they say, is the electric light from carbon points. The light of burning magnesium and the combustion of phosphorus in oxygen, they tell us, is violet.—*Journ. für prakt. Chem.*

Easy Preparation of a Weak Solution of Peroxide of Hydrogen.—Schönbein states that a weak solution of peroxide of hydrogen may be prepared by shaking violently for a few seconds amalgamated granulated zinc with a little distilled water contained in a large bottle. Oxide of zinc and peroxide of hydrogen are formed, but no zinc or mercury is dissolved.—*Chemical News.*

Mineral Ether.—Under this name a very pure and useful article has been introduced into commerce. It is free from all disagreeable smell, volatilises perfectly, leaving no odour, and removes grease stains most effectively.—*Ibid.*

A Useful Cement.—Junemann takes two parts of finely sifted unoxidised iron filings, mixes them with one part of perfectly dry and finely powdered loam, and kneads the mixture with strong vinegar until a perfectly homogeneous, plastic mass is formed, when the cement is ready for use. It must be made as wanted, for it quickly hardens, and once set is never fit for use again. The cement resists fire and water.

Volatility of Common Salt.—Mulder states that salt heated with coal in a gas retort to a dull red heat for five or six hours is volatilised to the extent of 60 per cent. The saline residue is poorer in chlorine and richer in sodium than the original NaCl. No carbonate of soda was found in the residue.—*Zeitsch. für Chem.*

Test for Gilt Articles.—To ascertain when an article is gilt or made of a gold-coloured alloy, Weber makes use of a solution of bichloride of copper, which makes a brown spot on an alloy, but produces no effect on a surface of gold.

New Use for Benzole.—M. Ferrere asserts that rectified benzole may be used advantageously for alcohol in the preservation of morbid specimens, anatomical preparations, objects of natural history, &c., &c. He adds that a mixture of benzole and alcohol will dissolve the hardest varnishes much better than benzole alone.—*Les Mondes.*

Wilde's Electric Machine.—Amongst other tests of the strength of the light obtained by this machine, it is stated that "a piece of the ordinary sensitized paper, such as is used for photographic printing, when exposed to the action of the light for twenty seconds, at a distance of two feet from the reflector, was darkened to the same degree as was a piece of the same sheet of paper when exposed for a period of one minute to the direct rays of the sun at noon on a very clear day in the month of March. The extraordinary calorific and illuminating powers of the 10-inch machine are all the more remarkable from the fact that they have their origin in six small permanent magnets, weighing only one pound each, and only capable, at most, of sustaining collectively a weight of sixty pounds; while the electricity from the magneto-electric machine employed in exciting the electro-magnet was of itself incapable of heating to redness the shortest length of iron wire of the smallest size manufactured," whilst when the intensity armature of this machine was placed in the magnet cylinder, the electricity from it melted seven feet of No. 16 iron wire, 0·065 of an inch in diameter, and made a length of twenty-one feet of the same wire red-hot.

Preparation of Oxygen.—The following is a process patented in France by MM. Maréchal and Tessie du Motay. The inventors decompose in a retort at an elevated temperature highly oxygenated salts, such as chromates and bichromates, manganates and permanganates, condensing aqueous vapour, and collecting the oxygen in a gasometer. The residue left in the retort is peroxidised again by the action of heat and a current of dry air. The inventors also propose to decompose sulphuric acid at a high temperature, fixing the sulphurous acid by means of magnesia. The sulphite of magnesia they decompose by heat, and convert the sulphurous into sulphuric acid in a leaden chamber to be decomposed again.—*Bulletin de la Société Chimique.*

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Talk in the Studio.

Resin Process without Nitrate Bath.—A correspondent, Mr. E. Brightman, of Bristol, says:—"Allow me to suggest a new method of preparing dry plates which is far more simple than any other in use, and which I think, from the few trials I have made, will give results quite equal to wet plates. Having seen in the News, a few weeks since, Mr. England's method of preparing dry plates with resin in the collodion, the idea occurred to me that the resin might be used with the collodio-bromide of silver, thus doing away with the difficulty of spoiling the bath, and occupying far less time in preparation. The formula is,—Collodio-bromide of silver, made according to Mr. Sayce's formula, one ounce; powdered resin, two grains. Coat the plate, and wash in a dish of distilled water, till the greasy lines have disappeared, then drain and dry: it is then ready for exposure. Develop with a strong iron developer, and intensify with pyro. and silver.

Bismarck's Photographer.—The Vienna correspondent of the *Daily News* gives the following on the authority of an officer whose father possesses one of the finest estates and mansions in the neighbourhood of the theatre of war, and who consequently knows the country round and the adjoining towns and market towns well:—"At Reichenberg, a few miles south-east of Zittau, lived for the last two years a photographer. Besides taking portraits, he occupied himself constantly with taking views of the country; but to do so being part of his profession, no one was surprised at it. It is now discovered that this photographer was a major in the Prussian service, who thus prepared accurate detail views for the time when it was known they would be wanted. This, as well as many other circumstances, not only proves that the present attack on Austria was a plan long ago organised and carefully prepared for, but it accounts for the exact knowledge of the country which the Prussians showed in the disposition of their troops."

Exhibition of Photographs, Works of Art, &c., &c.—A correspondent writes:—"The Fifth Annual Meeting of the Devonshire Association for the Advancement of Science, Literature, and Art, will take place on Wednesday, August the 8th, at Tavistock. The committee of the Mechanics' Institute are making every effort to collect a first-class variety of pictures, photographs, &c., &c. By this it will be found that photographers will consult their own interest by taking advantage of an opportunity which is expected to be more than usually attractive and successful. The general exhibition will take place in the New Hall. Papers will be read, and excursions made to places of interest in the county. It is intended, after the meetings of the Association, to continue the exhibition of pictures, photographs, &c., in the New Hall for a few days. As the unsettled state of the Continent precludes all hope of science and art finding a peaceful home for some time to come, native exhibitors would do well to turn their attention homeward, as, in addition to the Devonshire meeting, the Royal Cornwall Polytechnic Meeting will soon take place, when no doubt the committee will be glad to avail themselves of an opportunity for the display of specimens of *new processes* — say Swan's process, Woodbury's, Bullock's, Southwell's, and of any others who may feel inclined to make their labours known, always bearing in mind that the Royal Cornwall stands pre-eminent for civility and attention, and, to the full extent of their means, for liberality."

New Photo-Engraving Process.—Mr. Duncan Dallas, with whose photo-electric engraving process our readers are familiar, has recently brought under our attention a process whereby he produces blocks for surface printing by the aid of photography, which he proposes to call the Dallastype. The results we have seen have much promise. We hope shortly to recur to the subject, and shall probably bring an example of the results before our readers.

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To Correspondents.

⁂ Volume IX. of the Photographic News.—Agents and Subscribers are informed that several numbers of our last volume have now been reprinted, and that complete copies of Vol. IX. can be obtained of the Publisher.

R. M.—All spirit varnishes require heat in applying them, or they will dry dull and opaque. We once met with a spirit varnish, made by a secret method, which might be applied without heat; but it was not sufficiently hard for negatives. If you wish to avoid the use of heat you must employ a varnish the solvent of which is either chloroform or benzole. Amber or benzoin dissolved in chloroform, or gum dammar dissolved in benzole, may be used; but these are not so hard as a good spirit varnish. It is somewhat difficult to heat a plate evenly by means of the flame of a spirit-lamp. A piece of sheet iron, or a wire-gauze screen, interposed between the flame and the negative, will be found useful. If you have gas, a Bunsen's burner will be found useful for the purpose. 2. A bath which has been in use for some time, and has accumulated alcohol, ether, nitric acid, &c., will sometimes dissolve a portion of the iodide of silver out of a film left immersed all night, even when it contains excess of iodide. Dilute the bath with an equal bulk of distilled water, and you will find it become turbid, and finally precipitate iodide of silver; neutralize and sun; then add silver to make up the strength, and you will probably find it work all right.

Sea-Side.—We are uncertain of the publisher of any photographic copy of the "Blind Beggar." There is no photograph, we believe, which has been taken direct from the original. One photograph was taken from a copy made expressly for photography—a drawing in monochrome. Others are taken from lithographs. We do not, however, remember the publisher's name of any of them.

Firefly.—The best mode of dealing with your wooden washing tray, so that it shall not gradually become saturated with hypo, is either to line it with thin sheet gutta-percha, or to varnish it thoroughly with shellac dissolved in wood naphtha. The latter is the simplest and cheapest operation, the former will give the most durable result.

B. A.—The circular print, of which you enclose a copy, is a modern picture, and most likely copyright. You have not the right to copy the engravings in the *Illustrated London News* without permission; but it is probable that such permission would not be difficult to obtain. 2. We record, from time to time, the deaths of any of the men of mark connected with photography, but happily, hitherto, these deaths have not been so numerous as to render desirable the opening in our columns of a regular "Obituary" of record of deaths.

E. Brightman.—We have not met with such a difficulty as you describe; but from your description of the absence of any appearance of the uneven patches whilst the varnish is wet, but which appear when it is dry, we conclude that if you use a varnish of greater body, you will get rid of the uneven effect. A thin varnish is very apt, with certain kinds of negatives, to produce such an effect. Thanks for the dry plate suggestion.

Henry Berlon.—Thanks.

Impressions.—The only cause of failure which we can conceive is the use of an old hypo bath, which exercises a toning influence on the print. This would interfere with the bleaching by means of bichloride of mercury. There is a mode in which you may more certainly ensure the complete bleaching and disappearance of the image, but there is a risk of a little staining when the hypo is applied to restore it. This method consists in washing the prints very carefully, but neither toning nor fixing them. The unfixed prints bleach more readily than the fixed prints.

E. E. How.—The photographs you enclose are copies of a series of classical medallions, the subjects on many of which are obvious. There are five or six illustrating incidents in the story of Mercury, two or three illustrating incidents in the history of Diana, others the history of Neptune. The medallions appear to be fine; we are uncertain of their authorship, but can possibly ascertain.

J. Schofield.—We cannot add anything to the ample instructions which appeared in our last volume, detailing our own experiences and that of various correspondents. As was then stated, as samples of gelatine vary considerably, it is impossible to state an unvarying proportion. We have obtained good results with three quarters of a grain in an ounce of silver solution, whilst others prefer as much as three grains in the same quantity. It is probable that you are using too large a proportion. The glass-rod with which you stirred the solution containing gelatine was probably cold, and hence some of the gelatine congealed round it.

One in a Fix.—Gutta-percha vessels and gutta-percha dippers are often made of impure materials, a variety of adulterations being practised on gutta-percha. What the contamination in your dipper may have been to produce the result described we cannot tell, and therefore cannot, with certainty, prescribe a remedy. If neutralizing and sunning fail to restore the bath, boil it down to dryness, then fuse the result before redissolving it.

An Amateur.—The article of M. Despaquis forms a part of his work on carbon printing, and it assumes some knowledge, on the part of the reader, of the usual operations of the carbon process, as no one would commence his experiments in carbon printing by attempting to produce enlargements on canvas. The bichromated gelatine must of course have the colouring matter mixed with it. In order to secure half-tone, it will, of course, be necessary to print through the canvas from an enlarged negative, as directed. To what extent the canvas would be sufficiently sensitive to permit the use of the solar camera with any advantage, we cannot tell.

L. F.—The circumstance which seems so singular to you is very easily explained. We have no doubt that your negative is sharp all over, but you have placed the sensitive paper in the pressure-frame before it was quite dry, and being drier at the edges than in the middle of the sheet, it has wrinkled in a series of waves or ripples, thus preventing perfect contact with the negative, and consequent want of sharpness. As a novice in printing, you will have to acquire much by observation and experience, and which is too trifling to set down in a book of instructions. The toning is not bad.

Tyro.—The difficulty you experience in getting an even, clean background is very much due to the use of a thick glutinous collodion, which gives an uneven layer of iodide of silver. Use a more limpid collodion, and never sensitize a plate on which you have not secured an even perfect film of collodion.

R.—We believe that materials for carbon printing will shortly be ready for issue to the public. Terms and all details will doubtless appear in due time.

M. M. B.—With such a sample of soluble cotton as you describe, you may with propriety employ at least six grains to each ounce, and this proportion will give you greater intensity than a less quantity. We prefer to use a bromo-iodized collodion when it has been prepared about a week.

P. Stearn.—The most probable cause of the stains in the background of the negatives sent, is contact of the drainings of nitrate solution with the inner frame. These drainings, having acquired some contamination by such contact, flow over the surface again, and cause stains when the developer is applied. We notice that in each case the stain appears to flow from the edge of the plate where the drainings accumulate.

Several Correspondents in our next.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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TRANSPARENCY OF GLASS IN PHOTOGRAPHIC STUDIOS.

The extent to which the glass in photographic studios intercepts the light has, from time to time, obtained a slight amount of attention from photographers; but the subject has, we believe, received much less consideration than it deserves. When it is remembered that some examples of ordinary window glass obstruct as much as 13 per cent. of light, and that almost all samples gradually change in colour under the prolonged action of the solar rays, and in consequence of that change transmit less *actinic* light, the question assumes an aspect sufficiently grave for very careful consideration.

Two questions naturally arise at the outset: What kind of glass transmits the largest proportion of actinic light when first exposed? and What kind of glass changes least dangerously by long-continued exposure to sunlight? The first question may possibly be answered with tolerable accuracy; but in regard to the second the evidence is scarcely sufficiently definite to enable us to answer with absolute certainty. We propose, however, to glance at the evidence in existence, and we would at the same time strongly commend the subject to those who have accurate means of observation, as one demanding and worthy of careful experiment. Many years ago, Professor Faraday ascertained that certain tinted glasses became deeper in colour when submitted to the action of light, and various experimentalists have from time to time since noted similar results; but the question has not been the subject of an exhaustive enquiry with an especial view to its bearing on photography. To make such an enquiry, a large number of examples of glass, with *details of their manufacture*, should be carefully tested during a few months of summer light. These descriptions of the tint and appearance of the new glass are insufficient, without details of the manufacture of the glass, or, at least, information as to the cause of the especial tint, or freedom from any tint, the glass possesses. Accurate data of this kind may, it is probable, be very difficult to obtain, not only from the indisposition of English manufacturers to enter into details on such subjects, but from the fact that many of the samples of glass in use are manufactured on the Continent, and imported into this country.

Before epitomizing the facts which are known, we may, in passing, call attention to an interesting summary of a paper, on another page, by Mr. Gaffield, of Boston, U.S. Mr. J. W. Osborne, to whose courteous attention we are indebted for this paper, makes some excellent remarks on the subject in a private letter, from which we give some extracts. He says:—

> I conceive the subject to be of great practical importance to photographers, at least to those who are engaged in portraiture and copyings. Mr. Gaffield is one of the proprietors of a very large glass establishment, and I think his interesting investigations into the changes of colour which certain samples of glass undergo in sunlight, and his liberality in publishing defects of this kind, common to so many varieties of window glass, are worthy of much praise. I have corresponded with Mr. Gaffield respecting these phenomena—for as I am about to erect a large glass room, the subject is especially interesting to me—and have learned from him that he has continued his experiments much further than he had done when he prepared the paper above referred to (in December, 1863), and had arrived at some important results.
>
> I recollect, some two or three years ago, your warning me against the use of a certain kind of colourless French glass, recommended for glass rooms, which you had reason to think changed its colour; and I am therefore convinced that these phenomena are not quite new to you. Nevertheless, I think Mr. Gaffield is the first who has taken up the positive investigation of the subject, and I trust what he has done may stimulate others in England who have time for such inquiries, so that, in the end, the attention of the manufacturers may be drawn to this matter.

Glass Transmitting the most Actinic Light.—There can be little doubt that the most perfectly transparent glass for photographic purposes is the white crystal sheet, or white patent plate. The more completely colourless the glass is, the more readily it will transmit actinic light. The notion was at one time somewhat prevalent in this country, and is still entertained largely in America, that an advantage was gained by the use of blue glass. This fallacy, unphilosophical in itself, has been more than dissipated by experience, no advantage being gained in point of actinic illumination, whilst a positive disadvantage has arisen from the cheerless effect of the blue light, and from the difficulty of focussing and the misleading effect of the light and shade it presented to the eye. Blue glass does not transmit more actinic rays than colourless glass; the latter transmitting all that is admitted by the former, together with the non-actinic rays, which do neither good nor harm in producing the image. The best possible glass for the studio would be a perfectly colourless glass, which did not become deteriorated by exposure to light and air. How far the ordinary samples of colourless glass fulfil these conditions we shall consider shortly. Before entering upon the question of the chang which various kinds of glass undergo after exposure, we may here quote a statement from an article in the Photographic News, Vol. VI. p. 122, as to the amount of light intercepted by various qualities of glass in their normal condition. This statement is based upon a series of experiments made by Mr. F. H. Storer, in which the results were carefully estimated with a Bunsen's photometer. The light employed was artificial light from pure coal-gas, and the calculation does not necessarily imply the loss of actinism to the same extent. It may, however, be fairly assumed that the loss of illumination represents with moderate accuracy the loss of chemical action as well. For other details, and comments upon the experiments, we refer the reader to the article in our former volume; we here merely append the summary of results. For convenience of reference, the results are arranged in a tabular form. The first column gives the description of glass employed, the second column the thickness of the sheet, and the third column the loss of light in per centages, taking the whole amount of incident rays at 100.

"Single German" window glass	$\frac{1}{16}$ of an inch	4·27 per cent.
Thick English plate	$\frac{1}{3}$ " "	6·15 "
Crystal plate	$\frac{1}{8}$ " "	8·61 "
"Double English" window glass	$\frac{1}{8}$ " "	9·39 "
"Double German" ditto	$\frac{1}{8}$ " "	13·00 "
English crown	$\frac{1}{8}$ " "	13·08 "
Orange coloured window glass	$\frac{1}{16}$ " "	34·48 "
"Berkshire" enamelled, *i.e.*, ground only upon portions of its surface, small figure	$\frac{1}{16}$ " "	51·23 "
"Double German," ground	$\frac{1}{8}$ " "	62·34 "
"Berkshire," ground	$\frac{1}{16}$ " "	62·74 "
"Single German," ground	$\frac{1}{16}$ " "	65·75 "
Green coloured window glass	$\frac{1}{16}$ " "	81·97 "
Purple coloured ditto	$\frac{1}{8}$ " "	85·11 "
Ruby coloured ditto	$\frac{1}{16}$ " "	89·62 "
Porcelain transparency (Tyrolese Hunter)	$\frac{1}{16}$ " "	97·68 "

Deterioration in Glass from Exposure.—The change in the colour of glass from photogenic causes is due to the nature of the metallic oxides entering into its composition. Faraday noticed, many years ago, that glass containing manganese was apt to turn purple under the action of light. In a paper read before the British Association at Birmingham, in 1849, Mr. G. Bontemps stated that glass containing manganese turned yellow on exposure to light. He says: "Having melted for the celebrated Augustin Fresnell the glass for the first polizonal lenses he made, and for which the whitest glass was desirable, these prismatic pieces of glass became yellow after a short time, without losing their transparency or polish of surface. I rightly attributed this colour to the presence of manganese." And in subsequent experiments he got rid of the change of colour by suppressing the manganese. He further ascertained that the change was due to photogenic causes, by exposing a piece of the glass to sunlight, and preserving the piece from which it was cut in the dark; the latter retaining its purity and freedom from colour, whilst the former turned yellow. He further noticed the tendency, in some samples of Bohemian window glass, to assume a purple tint when exposed to the action of light. Some samples of glass, he remarked, containing manganese, changed colour during the annealing process, if long exposed to heat; and he expressed a conviction that the tendency to change during exposure was in some measure modified by the degree of annealing the glass underwent.

In 1857, Mr. Forrest brought under the attention of the Liverpool Photographic Society the changes which glass underwent during exposure, and stated the results of his observations during several years. He found that white glass was apt to change to a purple tint, which materially obstructed the actinic rays. From an examination of the blue glass in the windows of York Minster, in which no change was apparent, the exposed portion appearing the same as that protected by the lead, he arrived at the conviction that glass slightly tinted blue by means of cobalt would transmit more actinic rays than ordinary white glass, and that it would not change under the action of light. He further stated that the glass least liable to change was the Ravenhead plate glass, which has a slight blue tint. It should be here observed, that many samples of what is termed white glass have a slightly yellow tint, and if a tint be present at all, we can readily concede that it is better that it should be blue than yellow. At a subsequent date, a committee, appointed by the Liverpool Society, reported the results of certain experiments undertaken to test the actinic value and tendency to change of various samples of glass. The general conclusions at which they arrived were that some samples of blue glass were liable to change, whilst others were stable, but that the best did not transmit more actinic light than some samples of ordinary sheet glass; and that whilst the whitest glass changed the most, it was, even in its changed condition, superior to any of the other samples they had tested.

The experiments of Mr. Gaffield, recorded on another page, confirm the general observations, to which we have already referred, as to the tendency of white glass to change colour under the action of light. In some further experiments, on which he has written to Mr. Osborne, he has acquired confirmation as to this tendency, and is disposed to attribute it to the presence of peroxide of manganese, which is used as a decolourizer in manufacturing the glass.

He says:—"I have produced the pink or flesh colour by exposure of the brownish yellow Belgian or French *sheet* glass for a year. I have also exposed white glass under all kinds of coloured glass (red, orange, blue, &c.), and have found that under the blue affected most, under purple next, and little or no change under the others." These facts would indicate that the phenomena were strictly actinic in their nature, and not dependent upon the effects of continuous heat, or the chemical action of the atmospheric gases.

There is another change to which many samples of white glass are subject, which has frequently come under our own attention, and which is not noticed by the authorities above cited: we refer to the tendency to a decomposition of the surface called "sweating," from which a serious loss of polish and transparency, and consequently of power to transmit light, ensues. This, together with the prevalent tendency to become yellow, destroys, unfortunately, much of the otherwise undoubted advantage of the colourless samples of glass. It is, however, more easy to say that some samples of glass should be avoided than to determine which should be selected. On the whole, we incline to believe, from a consideration of authorities and from personal observation, that the thin sheet glass with a bluish green tint—we believe of Belgian manufacture—will be found to possess the greatest number of advantages for glazing the glass room, as obstructing very little light at the outset, and having little tendency to change. The fact indicated in the tabular statement we have given above, that ground glass obstructs such a large per centage of light, is suggestive of the importance of preserving the glass in a condition the further possible from that of ground glass. The presence of a coating of dust or dirt, too common on the glass of studios, produces an effect closely approximating to that of grinding the surface. It is of vital importance, then, to keep the windows clean.

We add a few further extracts from Mr. Osborne's letter, which have an interesting bearing on the question:—

> Is it not very strange that a substance like glass, coming from a state of fiery fusion, favourable to the undisturbed play of affinities, and consequent formation of stable combinations, should still contain within its mass bodies in which the chemical forces are so delicately balanced as to have their equilibrium overturned by the vibration of a ray of light? Does it not remind one of certain states of molecular tension in masses of glass, where slight physical causes give rise to apparently disproportionate results?
>
> Leaving the consideration of this analogy, I would say that the quantity of actinic light lost to the photographer is a question of great practical importance to him, and one deserving of further investigation, for it will not require a very dark tinge of yellow to cut off 25 per cent. of such light. The result must be a proportionate lengthening of the time of exposure, and of course the gradual manner in which changes of this kind take place make them insidious, and therefore dangerous.
>
> Mr. Gaffield says that he is inclined to think that to the use of the peroxide of manganese (employed as a decolourizer, inas-

much as it peroxydizes the protoxide of iron which colours the glass green) is to be attributed its liability to change; but he does not speak very positively, and the subject is obviously beset with difficulties. He has invited me to see his fine collection of exposed and unexposed specimens, which I will certainly do when next in Boston, and then perhaps give you some further facts.

PRESENTATION TO THE PRESIDENT OF THE SOUTH LONDON SOCIETY.

On Saturday last, when a number of the members of the South London Photographic Society availed themselves of the invitation of their President, the Rev. F. F. Statham, M.A., F.G.S., &c., to spend an evening at his house, an interesting presentation was made. The rev. gentleman, not himself a photographer, and only interested in it as an accomplished student and lover of science generally, has occupied the position of President of this Society ever since it was established, upwards of seven years ago, and has presided over its meetings with a degree of earnest assiduity and ability which have done much to secure the success of the Society, whilst his uniformly urbane and genial spirit has not only added a charm to the meetings, and preserved them from the occasional tendencies to acerbity which are inseparable from occasions of discussion, but has won for himself a degree of esteem which has ripened, amongst the members generally, to warm personal regard. A suggestion, emanating from Mr. F. Howard, the excellent Secretary, was recently carried into execution privately, to obtain from the members generally specimens, either of their own photography, or of such examples of the art as they deemed most suitable for presentation to their President. A fine collection of photographs was thus formed by the contribution of a number of the members, and these, in a handsome portfolio, with suitable inscription, were presented on Saturday evening last. Mr. Wharton Simpson, one of the Vice-Presidents, was deputed to ask Mr. Statham's acceptance of the collection, which he did in brief words, expressing the warm admiration and regard of the members generally for the services and person of their President. Mr. Statham, who was altogether taken by surprise, expressed his gratification with such a presentation from the members, and the great pleasure which he derived from being associated with the Society.

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The President of the Photographic Society—Panoramic Lenses and Pictures—War and Photography—The Volunteers—The National Portrait Museum—Eliminating Hyposulphites—Cabinet Portraits.

The retirement of Sir Frederick Pollock from the post he has so long honourably occupied, that of Lord Chief Baron of the Exchequer, although undoubtedly a loss to the country, will be a great gain to science, and especially to photography and the Photographic Society of which he is President. We all know how much more interesting the meetings of the Society are when he presides, and we have all regretted that his incessant attention to his duties has prevented his being more frequently amongst us. These duties having now ceased, it is probable that he will oftener gratify us with his presence. Many eulogistic articles have been written on the late Lord Chief Baron, but perhaps nothing could more nearly describe his rare qualities than the following passage from one of Montaigne's essays:—"I will take man in his sublimest state. Let us view him in that small number of excellent and select men who, having been endowed with a curious and particular natural talent, have, moreover, hardened and whetted it by care, study, and art, and raised it to the highest pitch of wisdom at which it can possibly arrive. They have adjusted their souls to all senses and all biases, have propped and supported them with all that they could borrow for their advantage, both from within and without the world. Those are they in whom resides human nature to the utmost degree of perfection. They have regulated the world with polity and laws. They have instructed it in the arts and sciences, and also by the example of their admirable manners. The maladies and defects that we shall find amongst these men, the world may boldly declare to be purely their own."

During my late excursion, of which I spoke in my last, I took with me one of Dallmeyer's panoramic lenses, embracing an angle of over 100°; this I found to be an admirable instrument, fully performing all that was required of it—the definition perfect, and the length of exposure necessary wonderfully short—not exceeding, for a 15 by 12 plate, that required for lenses made to cover only 8 by 5; but I was surprised to find—especially after the call that has been made for wide-angle lenses—that I could meet with few subjects on which it could be employed to advantage; and this objection would apply to all panoramic photographic pictures. The difficulty is, partly, that so wide a section of nature as they include is almost certain to contain some feature not sufficiently interesting for representation; and partly, that the prominent object which should occur in all pictures is so dwarfed and swallowed up by the uninteresting portion that it is lost, or appears insignificant; but, on the other hand, it enables the photographer to secure representations of some objects which hitherto, from the confined space in which they are situated, could not be represented at all; and I should never think of going for a photographic excursion without including one of these lenses in my outfit.

War has its victims other than those who go to kill and to be killed, and photographers are of them. The closing of the Ghent Exhibition, in consequence of the unsettled state of the Continent, is a great disappointment to many intending exhibitors who had prepared large contributions for this purpose. It is to be hoped that this will be only a short interruption to the scheme, which was received with much favour by English photographers.

I suppose we may soon expect to have the horrors of the battle-fields—so much of them as can be seen, not that which is quite as horrible, that which can be heard—brought home to us, for I understand many photographers have joined the Austrian and Prussian armies for the purpose of reproducing the events as they take place; thus preserving a sort of pictorial history of a war in which, as far as the destruction of human life is concerned, what used to be the work of years has been done in days. It is a curious fact, and unfortunate for the photographers, that the most important battles have taken place in dull, rainy weather.

In connection with photography and war, the following paragraph is going the rounds of the country papers, and will probably be news to Mr. Johnson. It is a puzzle to me how these wonderful flying paragraphs come to be originally written. They are usually founded on fact, but become so varied that an original inventor would have difficulty in recognizing the description of his invention. Another characteristic is, that they always give startling novelties a French origin. Here it is: "An ingenious method of getting a correct representation of an actual battle, landscape, &c., in a panoramic form, has been suggested in Paris. The main feature of the arrangement is a revolving cylinder, with a vertical slit in it, through which the images, &c., enter, and are thrown on a photographic medium properly sensitized."

From the soldiers of war to the soldiers of peace is but a step. Our volunteers have fought their fight, received their prizes, and been honoured with photographic immortality at Wimbledon during the month. Mr. Herbert Watkins, Mr. Vernon Heath, and many other artists, have been engaged on the Common during the meeting, and, favoured by the weather, have met with more than usual success. Watching the photographers at work, and endeavouring to get within the field of view, so that they might be "took" in good company, afforded sport to many who should have known better, and filled up the two or three hours of waiting before the review on the last day of the meeting.

We have heard very little of Mr. McLachlan's capital scheme for the formation of a National Photographic Portrait Museum lately, and what little we have heard does not seem likely to add much to the success of the undertaking. The most important consideration for the committee, before any further progress could be made, would undoubtedly be the adoption of some absolutely permanent method of printing the portraits of the illustrious personages it would be thought desirable to transmit to posterity; at the same time beauty of result must not be sacrificed to permanency; on the contrary, the less permanent we can make bad work the better.

On the score of beauty of result, Swan's carbon process, as it seems to be admitted by all who have examined the results, produces by far the most perfect of the carbon pictures yet brought before the public, far surpassing some for which more arrogant claims have been made. On the score of permanency, I am not aware that any doubt can be raised. It is true that the pictures can be destroyed, and so can engravings; and no one doubts the permanency of engravings. Remembering this, is it not worth while for those concerned to give their attention to this process as the means of obtaining a permanent collection of portraits?

Speaking of the carbon process reminds me of the recent efforts to secure permanency in silver prints. I have read with much interest the various communications on the subject of getting rid of hyposulphites by means of oxydizing agents; but I must confess that I have failed to derive much comfort from my reading. Our silver prints, when they are good, and from good negatives, are often so beautiful, and so rich in colour—we have spent so many years gathering together experience on the best modes of producing them—that it is with some feeling of regret one contemplates the necessity of abandoning silver printing, as it appears to me that conscientious photographers must do very shortly, when the carbon process comes with perfect facilities before them. When, therefore, any plan is propounded by which it appears probable that permanency may be secured in silver prints, I for one listen with eagerness and interest. I am sorry, however, that so little promise is afforded of effecting much, even if photographers were likely to employ a troublesome and expensive process. Imperfect washing is, of course, an evil; but I do not find that the most trustworthy judges regard this as the most prevalent cause of fading. The fathers of photography, of whom I know several, produce specimens in good preservation which were hastily washed in a few changes of water. Many copies of "The Pencil of Nature," printed by Mr. Talbot soon after the invention of Calotype, are still as bright as ever, although only washed for two or three hours. But these were fixed in fresh hypo, and they are chiefly on plain paper. But even if this were a more frequent cause than it is, it appears, from the experiments of Dr. Reynolds, that peroxide of hydrogen will not eliminate the hypo, but instead of improving the matter, is only likely to hasten decay. Whether Mr. Hart's method, which is so much cheaper, will be more efficient, I cannot undertake to say; but from all I can learn from the dispensers of these agents, photographers generally have little faith in the matter, and very little indeed of either of the oxydizing agents has been enquired for. So it seems that the necessity of a carbon process as a means of securing permanent pictures has not been removed by a fresh probability of stability in silver prints.

I am glad to see that photographers are at last becoming fully alive to the necessity of offering the public something different to the card picture. The carte de visite has done its duty. It was a grand success, and kept photographers busily engaged for several years, but the demand has fallen off; the public is fully supplied, and it is mere folly to endeavour to galvanize into life that which is dead. I notice that, although London photographers generally originate improvements, those in the country are the first to profit by them; and am pleased to find that in many places the suggestion recently made by Mr. Window—that of a larger picture, of definite proportions, rather more than twice the size of cartes de visite, and to be called "cabinet portraits"—is being warmly taken up. If the production of this kind of picture were to take the form of a general movement, and if all photographers would exhibit specimens of them, they must become fashionable, and the public would be obliged to have them. Ladies' fashions originate with milliners and dress-makers for their own benefit, and they usually make sufficiently distinctive difference to compel their customers to purchase. Why should not photographers take the hint?

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PHOTOGRAPHY, OUT AND ABOUT.

BY A RAMBLER.

The weather has now fairly set in for professional and amateur photographers to look up their apparatus and processes, and proceed to in- and out-of-the-way places to record on their wet or dry plates the charming variety of natural beauty. Now is the time for the philosophical amateur to test the soundness of the theoretical ideas that have cropped up since he was out last season. Now is the period for the enthusiastic art-photographer to rush forth with his accumulated experience to seize those transient beauties of nature that have hitherto escaped him, to catch the ripple on the water, the shimmer on the leaf, the fleecy cloud, and the foaming wave. Now may he record the wondrous manner in which objects are modified by the natural magic of light and shade, observing them by the dreamy mist of the morning and the romantic long shadows of evening, as well as by the overpowering brilliancy of noon. Now is the time for the mechanical man to put forth his strength, and test the value of his ingenious dodges. Now, in short, whether working in-doors or out-doors—but especially out-doors—can photography be practised under the most advantageous circumstances. Now is the time for testing the suggestions, instructions, and experience that have so freely been dispensed during the winter months. Now is the time to re-read the many useful and clever articles that have been published on artistic landscape photography, and particularly the one contained in Mr. Mudd's valuable and amusing *brochure*. Mr. M. treats the general subject so practically that no one can read his article without being better qualified to take an out-door scene than he was before.

Mr. Dunmore has also done good service in recently calling attention to the necessity of having our foregrounds well occupied. Excellent, however, as his remarks were, they may be supplemented by telling us how we are to *remove* objects from the forground when they do not compose well with the rest of the picture. For instance, in "doing" suburban and town scenery, what a nuisance is the hard, unpicturesque lamp-post! It generally manages to get quite in the foreground, and looks twice as large as life, and correspondingly ugly. Then white gates, and whitewashed walls, and newly-painted palings—what are you to do with them? You can't remove them, you mustn't tone them down, and it will take six months to weather them into a suitable hue.

Of course, if it is a commission that has to be executed, there is no option but do the best under the circumstances; or if it be a scene where the actual rather than the beautiful is desired, the same applies. But if a photographer is out, like Dr. Syntax, in search of the picturesque, and such obnoxious annoyances present themselves, I am sure such high authorities as Mudd, England, or Bedford, will say that the view had better remain un-taken. I remember a photographer once showing a view of a house to an artist, and who, in answer to the complaint of distortion, explained, that if the picture had not been taken from that point, it could not have been taken at all. The artist replied, "Then it should not have been taken at all."

Some photographers, when they are let loose in the country, think anything worthy to be photographed, and recklessly point their camera at any new house or old barn. These men exult in the number of negatives they can get in a day—have, in short, a photographic *battue*. How different this experience must be to such as Wilson, of whom we hear that he will wait for days, or even weeks, before his view, until he gets the exact conditions he desires! I have heard it stated that England finds two or three negatives a day—especially if a little distance asunder—as much as he can manage. But when obtained, what negatives they are! Judging from these men's works, one would think that they had none of the difficulties that assail lesser skilled individuals. Much of this doubtless arises from their having the good sense to point their cameras and use their plates only at such places and times that they are morally assured they can produce good negatives. If this be a clue to their success—and I think it is—there is so much common sense in it, that there's no wonder so few discover it.

But there is a class of troubles that the out-door photographer is subject to, that I have never found sufficiently descanted on. Supposing that by the aid of all the science that the societies and the journals provide, that he be equipped with the best apparatus and the most perfect process, and supposing that his view be selected to the satisfaction even of a snarling art-critic, what does all this avail if, just before he exposes, some stupid object is placed a few yards in advance of his camera, so as to cut off half or more of the view?

A friend of mine was out one day, and, after much expenditure of time and patience, had succeeded in getting on his ground glass a picturesque view of the main street of a quiet country town. Before he got his plate ready, a waggon, loaded with straw, stopped just in front of the camera. "Go on, master, with your waggon there," said my friend. "Go on yourself; as much right in the road as you, anyhow. Who be you, I should like to know? Some tuppeny-happeny likeness-taker, I dessay." My friend—he was head clerk in a city bank—gave up the contest, and moved his camera away as soon as he could. Now this is the kind of trouble the out-door worker experiences in the neighbourhood of towns and villages.

There are some men get good pictures *without* a crowd of stupid gazers staring at the lens. I wonder how they manage it? I can never put my camera at the corner of a street or lane, but, if nobody was to be seen about for the last quarter of an hour, they all manage to turn out then; and where they come from I don't know. There is always sure to be a woman with a white apron, and a baby in her arms; then there's the girl with the perambulator, and of course there's the baker's boy and the butcher boy, and the greengrocery boy, and the grocery boy that isn't green, as well as twenty other boys that have no occupation. The men and women are bad enough, but the boys—oh, the boys!—who's to deliver the poor unhappy out-of-door photographer from these wretched boys? "I say Jack, here's a lark. Here's a man going to take all our likenesses; come on and get a good place." Then the wretches range themselves in a row, every eye direct on the camera. When my head is under the focussing cloth, the most impudent of them—it's generally the fellow with the white holland blouse and dirty straw hat—steps forward and peeps into the lens, as if it were a peep-show. I really think these young villains imagine that a photographer is a sort of Punch-and-Judy man without the drum, who comes to amuse them. I used to get angry with the brutes at first, but that didn't answer. "Go away, boy." "What for?" "Go away, I tell you." "Shan't for you." I threaten to box his ears. "Ah! you just do," says the rogue, as he picks up a stone to throw at me, or, worse, at my camera.

I once tried another plan. Three boys put themselves in my way; they were not picturesque, and I was sure they would move, so I bribed them with a penny each to stand aside. By the time another plate was ready there were *ten* boys and a girl, who would not budge away from the front without their pennies; they seemed to claim it as a right, and one rascal came twice. I thought of using a third plate, but the word had been passed round, and there came a troop of nearly a hundred children from the National School in the neighbourhood. This quite satisfied me that the "penny" business would not answer.

As neither bribery nor intimidation was successful, I now rely on stratagem. When I get only one or two boys, and they happen to be of a good sort, I get them to sit down in the foreground with their *backs* to the camera. I tell them they must be quite steady when I focus them—*hocus* would perhaps be more exact—and that I cannot focus them unless they turn their backs, but that when I take their likenesses I'll whistle, and then they may turn round and look at the camera. I then—watching them that they don't turn round—expose my plate, and having capped the lens, give a whistle and allow them to indulge in a hearty stare. "It pleases them and doesn't hurt me," as the navvy said who allowed his wife to beat him.

When there are several boys this plan doesn't answer. The scoundrels are too active and curious to be quiet, and they will see what is going on. The best plan is to take them into your confidence, and tell them you will take all their likenesses on condition that they stand where you think they will look best. The rascals will be sure to agree. Then place them some on one side and some on the other, but *so that they are out of the picture*. Tell them to be quite still—which they won't be—and expose the picture as usual. The young fools are quite contented with their share of the proceedings, and will most likely go about their business quite satisfied.

When a miscellaneous crowd of all sorts of people collect—of course, they all stand and stare at the camera—some stratagem must be adopted to deceive them. So long as they see you bustling about, they will remain gazing; but when they think you are done, or not going to begin again, shortly they will resume their usual occupations. The camera may therefore be put in focus, the plate put *in situ*, and all be ready for taking the cap off the lens, *except the drawing up of the dark slide*. Most persons now know that taking off the cap of the lens and replacing it, is the most vital portion, and they look to this as the climax. When they see the cap taken off, and after a time replaced, they reasonably think it is all over, and will probably disperse. Then is the time really to expose. It is often a good plan when you are all ready to uncap the lens, and when your crowd of gawkies are all staring with *fool* faces and open mouths at the camera, to deliberately ignore them, and, if you have a companion, to begin conversation, turning your back on the crowd; or, you may sit down on the grass, and pull a newspaper out of your pocket and commence reading. To light a pipe or cigar is not a bad ruse. It is very gratifying to observe the crowd disperse, and then, with a lull, to snatch the exposure.

I wonder how Mr. Blanchard must have got on "doing" the streets of London, the sands of Margate, the beach at Brighton, and even the humours of a country fair? What a fund of amusing anecdotes he must have of his adventures, and what a world of invention and resource he must have to so successfully overcome the difficulties of photography in the streets!

Stray Papers on Photography.

No. 4.—WATER AND SKY.

Two of the greatest difficulties felt by the landscape photographer are found in his attempts to render water and sky. I propose, in this and the following paper, to make a few observations on these two elements of the landscape, my object being more to draw attention to a subject by far too much neglected than to give any definite rules or formulæ for the successful treatment of the cases I shall have to mention. I do this because I hold it of the first importance even in photography—where the picture is, so to speak, taken for you—to know exactly the reason of every light and shade and blending of colour in the picture. This knowledge may be of essential importance in the printing department, and for want of it many a picture has been spoiled, both by artist and photographer.

In the present advanced state of the art of photography, I need hardly refer, under the head of water, to the more simple cases of what is called "instantaneous photography." The taking of breaking waves by using a very rapid exposure is easy enough, and the application of underdone pictures of the reflection of the sun to the representation of moonlight is a trick of which all photographers are by this time aware. It is to the more complicated effects of light and shade produced by the breaking up of reflections of objects into a thousand distorted miniatures—by the play of the gentle ripple, and to the effects produced by the transparency of the water—that I will now draw the attention of your readers.

We may consider that the simple reflection of objects is the normal condition to which water would always return in the picture when no disturbing cause was found to operate upon it. There are three of these disturbing causes found almost constantly at work. I have mentioned two, viz., the ripple and the transparency; the third is found in the *shadows* of other objects, which alter very materially the relations of colour.

When the reflection of any object—such as a tree, for instance—is broken by a ripple, the first effect will be seen in the introduction of a new colour, or system of colours, into the picture. These will be produced by the reflections of objects either above or behind the observer, seen on the top of each wavelet, or on that side of it which is next the eye.

Besides this introduction of a new system of colours, the ripple on the water will often cause a bright streak, or series of streaks, of a silvery whiteness, which will sometimes occur even in the darkest parts of the reflection; and wherever they do so they are sure to be of great value in giving relief to some of the darker masses of the picture. These brilliant lights are caused by the reflection of the sky, generally of that part of it which is directly overhead.

It will be seen, on a little consideration, that the direction in which the length of any wavelet stands from the eye of the spectator will, in a great measure, determine what objects it will reflect. Thus, the most beautiful combinations of colour are often produced by the curvature of the general lines into which the wind or other cause drives the ripple. As a rule, the details of the objects reflected upon the curved surfaces of the ripples are too much distorted to be clearly made out, though the masses of colour are often distinct enough to bear an exposure of about one or two seconds in the camera.

With regard to the effects produced by the transparency of water on the colours, and by its refracting power on the forms of objects seen beneath its surface, I would observe that the colour of the objects seen will assimilate to that of the water more and more as the depth increases. The effects of refraction are almost beyond the purpose of this paper; every one knows how the water always looks shallower than it really is, and how objects immersed in it always seem nearer the surface than they really are. I would point out, with regard to objects seen below the surface of water, in conjunction with the reflection of other objects seen "in the water," that the objects at the bottom are shown more clearly in the dark parts of the reflection than in the light parts. Thus, we can rarely see the bottom of a stream when it reflects the sky to us; but when some dark object, such as a rock, affords by its reflection a shade to our eyes, then we can often discover every weed and stone and minute detail thereon.

Now, although, as I have said, many of the more simple effects of reflection might easily be taken with rapid plates, and though it is easy enough to render both the reflection and the transparency of water in a long exposure, when we come to speak of the combination of the two effects we have a subject which has never yet been rendered faithfully, either by the painter or the photographer.

When we consider the complication which arises from the reflection of an object or series of objects broken into a thousand distorted images, and mixed up with the reflections of other objects, often not seen in the picture, the sombre tints of the weeds and rocks under the surface of the water showing through wherever the position and colour of a wavelet will permit, the whole system of colour and light and shade being modified by the cast shadows of surrounding objects, and often a dark and heavy mass, relieved by the pure silver light from the sky, and often an extra high ripple reflecting the sun itself, surely we have an effect which must ever baffle the hand, if not the eye, of the most skilful painter, and one for the successful rendering of which we must look to the mechanical though truthful art of photography.

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NOTE ON LIQUID SUGAR, WITH REFERENCE TO THE ACTION OF LIGHT.

BY DR. T. L. PHIPSON, F.C.S., ETC.

It was announced some time ago in the *Chemical News* that light had a peculiar action upon liquid sugar, which it caused to crystallize. The experiments were made by a German chemist, and it was asserted that this was the reason why bees always work in the dark!

At the time this announcement was made I had a bottle of liquid sugar which I had prepared in Paris in 1856 from honey; and this bottle, freely exposed to the light of day since 1860 on the shelves of my laboratory here in London, shows no crystalline production. Since then, I prepared some liquid sugar from figs (obtained as a secondary product of the preparation of grape-sugar in which this fruit abounds), and neither did this liquid sugar show any signs of crystallization when exposed many months to the rays of the sun.

It appears probable that the cause of the error reported by the *Chemical News* consists in this, that the liquid sugar experimented upon was not pure, but contained dissolved a certain quantity of grape-sugar, which was slowly deposited, and preferably on the side of the bottle exposed to the light; for it has been many times observed that light appears to attract towards its source certain crystals deposited from their solutions, as it also appears to attract certain animalculæ, such as the fresh-water *Hydra*, &c., that are invariably found adhering to the sides of the glass which are turned towards the daylight.

I believe other chemists have also found that light does not cause liquid sugar to crystallize, and as the substance in question has been used in photography, the above facts are perhaps worth noting.

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ON THE METHODS OF TAKING TRANSPARENT PHOTOGRAPHS OF OPAQUE OBJECTS.

BY SIR DAVID BREWSTER, K.H., F.R.S., PRES. R.S. EDIN.*

In 1844, when Messrs. Hill and Adamson, from Edinburgh, were taking a photograph of the Minster at York, a boy seated himself upon one of the steps near the principal doorway while the picture was in progress. Having received a copy of the photograph, I was surprised to observe that the portrait of the boy was *transparent*. The lines of the stones behind him having been imprinted on the sensitive tablet in the camera before the boy sat down, they were seen through his portrait, which, consequently, appeared transparent.

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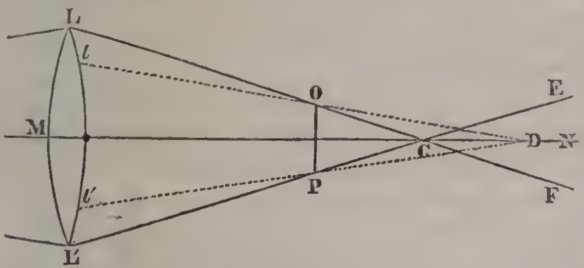
* *Scientific Review.*

The value and application of this fact did not at first present itself to me; but, after I had contrived the lenticular stereoscope, I saw that such transparent pictures might be used for various purposes. One of these—namely, that of representing *ghosts*, either in binocular photographs of external nature, or domestic scenes—I communicated to Mr. Nottage, the accomplished director of the London Stereoscopic Company. He accordingly executed several pictures of this kind, which excited great interest, and which have been imitated and admired in every part of the world where the stereoscope is in use.

The method of doing this is very simple and easily understood. The photographer arranges the parties who are to be present, and fixes the place where the ghost or the angel is to appear. The parties direct their eyes to this place, and assume the attitudes and expressions, either of joy or of fear, which the apparition is likely to produce. When the portrait of the apartment, or of the external landscape, has been nearly finished, the person who is to represent the angel or the ghost rushes quickly, in suitable attire, to the place to which all eyes are directed. His portrait is then taken, covering the walls or trees, or other objects directly behind or beyond him. When the photograph is completed, the angel or ghost will appear transparent, because the wall and other objects have been already imprinted on the picture, and, consequently, are seen through the body of the apparition.

Referring to this method, Professor Mach proposes to apply it to anatomical preparations, as explained in another article;* and he has sent me a stereoscopic picture of a transparent human skull, in which the cavity of the organ of hearing, photographed from a cast, is seen through the temporal bone, made transparent by the preceding process.

In studying the imperfections in the camera pictures of solid objects, when taken with large lenses—imperfections not yet sufficiently attended to, if even admitted, by our most eminent photographers—I was led to another method of making opaque objects transparent, either in monocular or binocular photographs. This method is described in my "Treatise on the Stereoscope;"† but it has not excited any notice, and, in so far as I know, it has not been tried by any photographer. If the area of the opaque body is so much less than that of the lens of a camera that its shadow, formed by rays diverging from the place of the object or scene to be photographed, does not cover the whole of the lens, the picture of the opaque body will be formed by rays falling on the whole of the lens, while the picture of the scene, or the objects situated farther off than a *certain point* beyond it, will be formed by rays falling on the part or parts of the lens which the shadow does not cover. This will be understood from the annexed figure, where L L is a section of the lens of the camera, O P a section of the opaque object, and N the place of the scene or objects to be photographed. Through the points L, L′, O, P, draw the lines L O, L′, P meeting at C, and continue them to E and F. Objects behind O P, and situated within the angle O C P, will not have a picture of them formed by the lens L L′, because none of the rays which proceed from them can fall upon the lens, if the opaque body O P is a circle. But if the opaque body has a different shape from the lens, pictures of objects within the angle O C P may be formed by rays falling upon the parts of the lens which the shadow of O P does not cover. If O P is a circle, the pictures of all objects not within the angle O C P will be taken by rays falling upon the parts L l, L′ l', or those other parts which the shadow of O P does not cover. The rays, for example, of an object placed at D will fall upon the parts L l, L′ l', and a picture of it will be formed in the camera as if it were seen through the opaque body O P. If the sun were in the direction M N, his photograph would appear in the centre of the opaque body O P.



This method of making opaque objects appear transparent may be illustrated by a simple experiment. Direct a telescope or an opera-glass to an object so as to see it distinctly, and place a finger across the object-glass. The object will be seen as distinctly as before, but less brightly, because, in the first case, the picture is formed by rays falling upon the whole of the object-glass, whereas, when the finger is applied, the picture is formed only by the rays which fall upon the parts of the object-glass which the finger does not cover.

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* In our next.

† Chapter X., p. 175, Fig. 48.

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ACTION OF SUNLIGHT ON GLASS.*

BY THOMAS GAFFIELD.

The writer made some remarks on the action of sunlight on window-glass.

He believed that his experiments in connection with the subject were original as to their method and their extent, although it had long been observed in Europe that colourless or light-coloured plate-glass had turned to a purple hue by exposure to intense sunlight. One case† is cited of a change to a gold colour; and one experiment recorded by Dr. Faraday,‡ some forty years ago, proving that a light purple changed to a darker hue after eight months' exposure.

Other experiments are on record, showing the action of glass of different colours as media in the transmission of light and of heat; but none, with the above exception, showing the effect produced on the glass itself.

An experience of some twenty years in the window-glass business had only presented a few isolated cases of supposed change of colour from this cause, which were attributed to some obvious defect in an article of inferior manufacture; but, within a short time, he had heard of the change of colour in an article of superior manufacture, in a quantity of white-plate glass, of which some lights had been broken out of a window in which they had been exposed to the sun.

This fact coming to his knowledge led him to try an experiment with several specimens of plate, crown, and sheet glass, during the month of July last; which proved that a month's exposure to a hot sun would change the best white French plate and all white sheet glass, such as is used for photographs and engravings, to a colour containing more or less of a yellow hue. The dark green and dark blue or bluish green did not experience any change; but any hue which approached a white, whether blueish, greenish, or yellowish white, turned to a yellowish colour.

A second series of experiments, commenced in July, and continued three months, on some thirty specimens from France, England, Belgium, Germany, and the United States, only confirmed the results of the first; and a daily examination at first, and afterward from week to week, and month to month, revealed the interesting fact, that, even after a single day's exposure to a July sun, the change of colour will, in some instances of the lightest hues, commence.

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* Proceedings of the Boston Society of Natural History, Vol. IX.

† Journal of Society of Arts for Feb. 15, 1854.

‡ Dr. Faraday's Chemical Researches, London, 1859, p. 142.

So remarkable was the change in a week, affecting nearly all the light-coloured glasses, that Mr. Gaffield commenced a third experiment on the 6th of August, which should speak for itself. He then exhibited to the Society ten pieces of French white plate-glass, four by two inches in size (all of which were cut from the same sheet), one of which showed the original colourless glass, and the others exhibiting the change of hue towards yellow, after exposure respectively of one, two, and four days; one, two, and three weeks; one, two, and three months.

The changes in the first four days were slight; but the last specimens were so yellow as to exhibit a contrast very marked, and excited the interest of all the members present. That the colour permeates the body of the glass, and is not confined to the surface, or produced by reflection therefrom, has been conclusively proved by grinding off about one-sixteenth of an inch from both surfaces and the four edges of a duplicate exposed specimen, which, after repolishing, still exhibited the same yellow colour.

The glasses exposed were all what are called colourless window-glasses, although they varied in tinge and hue from the whitest French plate to the darkest green English sheet-glass.

An experiment for four months, from July to November, on really *coloured* glasses—red, green, yellow, blue, and purple—showed no change except in the purple, which became slightly darker.

The experiments were carried on upon a rough plate-glass roof, nearly horizontal, and which received the rays of the sun during the greater part of the day. In all cases, strips corresponding to those exposed, and cut off from the same pieces, were placed in the dark, to be compared with the other specimens after exposure.

It will be noticed that the dark green, blue, and blueish green did not change. The colour of the Belgian sheet (called German or French by glass-dealers in America), a yellowish or brownish green, did not change; and these were the only exceptions. All plate-glasses changed, except an inferior blue quality, and a superior crystal plate of a greenish colour, made in Germany, and at the only factory which has not given up the use of pot-ash for soda-ash.

It is possible that a longer exposure of a year, or of years, might change every colour in some degree.

His enquiries, since he instituted these experiments, have brought out some fine specimens of Belgian sheet-glass from a house built three years ago, which had changed in some instances to a golden, and in others to the well-known purple hue.

It is Mr. Gaffield's intention to pursue the experiments farther, with a view to ascertain the effects of sunlight during each month and season of the year; and also whether exposure to heat, air, or moisture alone, out of the direct action of the sun's rays, will produce any corresponding change.

Mr. Gaffield does not propound any theory to explain these changes of colour, which, under our sunny skies, probably take place much more rapidly than in the different and less clear atmosphere of England.

Some writers point to the presence of oxide of manganese in the original composition of window-glass, and some to the oxide of iron, as a chief cause.

Some writers have peculiar theories about the different classes of the sun's rays. Some may think the change referred to a molecular or chemical one; and others, wiser than the rest, refrain from any explanation, waiting for a larger multiplication of experiments, and a greater accumulation of facts, before educing any satisfactory law of Nature which governs these curious and interesting phenomena.

Mr. Gaffield makes no pretensions to any discoveries, unless it be to the very rapid change in glass observed in our climate in July, but only gives the result of his experiments, in the hope that the great interest now manifested in the subjects of light and heat may lead others to examine the matter, to repeat the same experiments in other countries, and to give the world the result of their researches, and enable the learned and scientific men of the age to explain this remarkable power and action of the sun's rays.

It should be remembered that Mr. Gaffield submitted his specimens to the most severe tests, by placing them where they received reflected as well as transmitted light and heat. The change in glass when glazed in the windows of our dwellings and stores is so much more gradual, that it very rarely attracts the attention of observers, except in the marked variation from white to purple.

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ON NITRO-GLUCOSE PAPER FOR ENLARGEMENTS.

BY DR. D. VAN MONCKHOVEN.*

VII. *Repetition of Formula.*

Solution No. 1	10 cub. cent.
Glacial acetic acid	20 " "
Distilled water	100 " "
Solution No. 2	10 " "

The mixture to be well stirred; then add—

Distilled water... ... ... 4 litres.

Mix again thoroughly, and add—

Solution No. 3... ... ... 20 cub. cent.

This quantity of developing solution is sufficient for six sheets of paper measuring 45 by 59 cent., which ought to be successively immersed into the solution without stopping. If only two sheets are required to be prepared, a third of the above proportions is sufficient; for twelve sheets double the quantity will be required. When the sheets have been exposed to the action of light, they are dipped into the bath, carefully avoiding any air-bubbles. The picture then appears of a very dark red colour, the time required for producing this change depending upon the temperature of the bath.

The principal difficulties to be overcome in order to obtain good prints are as follows:—The bath must always be perfectly transparent, since the presence of even the slightest colouring causes the white portions of the picture to assume a dirty grey appearance. Solution No. 3 is intended to prevent the bath becoming turbid, but the quantity to be added is governed by the temperature. In winter (say at 10° C.) the 20 cub. cent. of No. 3 solution may be left out altogether; in spring (at 15° C.), that quantity may be employed; but in summer, or during very hot weather, the quantity must be doubled, or even trebled. The time required for developing varies between thirty minutes and several hours. Working at a temperature of 10° to 12° C., the formula given above will be found very suitable, and the prints will require one or two hours in developing. In summer, in order to obviate the tendency of the papers to become yellow upon development, it is desirable to work at a temperature not exceeding 12° C. All the solutions and vessels should be kept in a very cold place, in order that they may be perfectly cool when used. If it is desirable to work faster, the use of No. 3 solution is dispensed with; the pictures must be printed deeper, and in a quarter of an hour the whole operation may be completed.

The operation is interrupted as soon as the print has become slightly darker than the finished result is required to be, as the toning bath does not in the least degree weaken the impression. The print is then taken out of the bath and transferred to a vessel of water, where it is allowed to remain for half an hour. This operation is, of course, carried on in the dark. If plenty of water be used, a dozen prints can be washed at a time. The prints become of a clear brick-red colour in the water, and are then ready for toning.

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* Continued from p. 347.

VIII. *Toning the Prints.*

Ten grains of hyposulphite of soda and twenty grains of sea-salt are dissolved in a litre of water. One grain of chloride of gold, dissolved in fifty cub. cent. of water, is then added, which colours the solution red, without, however, rendering it turbid, if the solution be at the same time well stirred. After standing twenty-four hours, the bath becomes quite colourless, in which state it may be kept for a week or two. This quantity will serve for a large number of prints. After toning ten pictures (45 by 59 cent.), five grains of hyposulphite of soda and one grain of chloride of gold, dissolved in fifty cub. cent. of water, should be added. If the toning bath is required in a hurry, hot water may be used for dissolving the soda, and the gold is then added. The solution becomes at once colourless, and may be used while warm, yielding very good results.

The prints, having been washed after development as directed, are placed one at a time in the toning bath contained in a glass dish, where they are allowed to remain for a period varying from a few minutes to half an hour. If the bath is cold, the toning will proceed much slower than when it is warm. The prints in the toning bath change from a brick-red colour to a reddish violet, and afterwards to a blue, and finally to a black tone.

The prints are then laid in a fixing solution, composed as follows:—

Water	4 litres
Hyposulphite of soda	600 grammes.

This solution will fix twenty pictures, measuring 45 by 59 cent.

IX. *Finishing and Mounting the Prints.*

The prints are lastly well-washed in abundance of water, hung up, and dried. They are then mounted[*] on stiff glazed cardboard, and, when perfectly dry, coated with a gum solution, containing fifteen grammes of purified gum arabic to one thousand grammes of water. This coating should be applied by means of a short-haired brush, which is dipped into the gum-water, well pressed and rubbed over the surface of the picture, which is then allowed to dry. The picture is protected by a further coating of a varnish specially manufactured by Soehnée Frères.[†] This varnish dries rapidly, and should be applied quickly and sparingly to the picture, by means of a soft brush, which should be used as dry as possible.

After varnishing, the prints may either be worked up with oil colour, or with water colours, mixed with a little gum, in the ordinary manner. Very large pictures are improved by being strained upon a frame, and when mounted on canvas in this manner, have the artistic appearance of oil paintings, particularly if they have no white margin.

X. *Character of the Negatives best adapted for use with Nitro-glucose paper.*

The negatives should be full of vigour, but without any trace of fog; grey and feeble negatives do not give good results. The directions here given are not so suitable for ordinary work as for enlarging. According to my calculation, nitro-glucose paper is from twenty to twenty-five times more sensitive than albumenized paper, and great care must be taken in selecting negatives, as many that would be considered suitable for printing well with albumenized paper would not yield good results with nitro-glucose paper. For the latter, the negative must not only be free from fogginess, but must also possess a clear black tone. If the negatives are the least fogged, the enlarged prints on the nitro-glucose paper are feeble and of an inferior colour. The negative, when placed on a piece of black velvet, should appear like a glass positive, especially in the shadows. Such negatives, which are easily obtained with collodion, containing half a gramme of free iodine per litre (the iodine being added an hour or two before use), ought to furnish pictures equal to the finest results obtained from ordinary salted paper.

Correspondence.

THE FORMATION OF THE PHOTOGRAPHIC IMAGE.

Sir,—On examining my papers describing the theory of the formation of the photographic image, I find they convey to the reader the idea of a total cessation of action between the two forces of matter when in equilibrium. This is by no means correct; there is no such perfect balance known in nature, between these antagonistic forces, as is conveyed by the idea of a state of inactive opposition. When, therefore, a sensitized collodion film is described as composed of a combination of matter in which these forces are so exactly balanced as to neutralize each other, this does not imply a total cessation of action between them, but merely one of degree. In the wet film, although the electro-magnetic action still going on is not sufficiently powerful to attract the molecules of silver thrown down by the developer, it is yet apparent by the gradual loss of water it suffers by evaporation, and if the silver atoms precipitated by the developer were small enough, this action would be shown by the film fogging. As this electro-magnetic action increases in power with increase of temperature, it will betray its presence in a warm atmosphere by this effect, unless means are adopted to prevent it. The addition of acid to the developer, by increasing the size of the atoms of precipitated silver, enables the operator to obtain a clear image under these conditions.

Before concluding this description of the causes of photographic action, I would wish to draw the attention of the natural philosopher to the theory made use of, as the same causes in operation here described will be found producing all the varied phenomena of nature.

The combined forces of repulsive separation, in their antagonistic action to the combined forces of cohesive attraction, on the various elements of matter, directed and controlled by a Supreme Intelligence, suffices to and does produce all the phenomena of nature observed by man. Thus, by the phenomenon of light, the mind recognizes the swift motion of the forces of separation through matter; by heat, the effect of their antagonistic action on matter against the forces of cohesion; by magnetism, the continued decomposition of a part of the combined forces of cohesion, by a portion of the forces of separation; and by electricity, the isolation of the fluids thus decomposed by magnetic action.

A wide field of enquiry is here thrown open to the scientific world, and for the first time in history it will be found based on a theory of truth. But I counsel the experimentalist not to accept this, or any theory, without due examination, and if he can discover any phenomenon the causes of which cannot be explained by, or is at all contradictory to, the theory given, let him be very sure it is not founded on perfect truth.—I am, Sir, respectfully yours,

Yarmouth, July 20th, 1866. Thomas Ayers.

THE PHYSIOLOGICAL EFFECTS OF CYANIDE OF POTASSIUM.

Dear Sir,—Lately, several letters were written cautioning photographers against the use of cyanide of potassium, as injurious to the health; and as all agreed in condemning it, I think it but fair that I should state my experience. I have every reason to believe that the power of cyanide of potassium and ether are acting as cures of a cough, which I have had for many years. I commenced the practice of photography about five years ago, as an amusement. I liked it, and adopted it as a profession Since that time my health has gradually improved, and my cough is much less troublesome than it was. I did not know the cause, although I believe the use of the chemicals had something to do with it. Last year, a young doctor was spending a few days with us, and after considering my case for some time, he stated, that he believed that the power of cyanide of potassium and ether were acting as cures of my cough. He, however, cautioned me to be very careful in their use. That caution, I may say, I did not require, as I am very careful in the use of all my chemicals, both with regard to my health, and cleanliness in manipulating.

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[*] In mounting the picture, it is best to moisten the back of it first with a wet sponge, before applying the gum or glue, as the print is easily spotted by the gum soaking unequally into the paper.

[†] This varnish is used by painters for varnishing their pictures, and is known under the name of picture varnish.

I thought it right to say something in favour of cyanide, &c., seeing I believed they had been friends to me. If my friend be right in his conjecture, photographers, I think, should be cautioned against the abuse of cyanide, rather than against its use. If you consider it right to publish this letter, you may do so; if not, you may throw it into the waste-basket.—I am, dear Sir, yours obediently, D. Welch.

Cliff Lodge, Bundoran, Ireland, July 28th, 1866.

"THE REASON WHY."—TONING WITH MAGNESIA.

Sir,—The long time that has elapsed since Mr. Bovey's adieu to our controversy has possibly led you to think that I have dropped it likewise. I should like to, but before I do so, must ask your permission to reply to the following sentence in his last letter:—"My chief aim is to show that a solution which will not tone without the application of heat, and needs special papers and special conditions to coax it into a good working humour, must, perforce, be somewhere wrong in principle; and my experience points to alkalinity as the source of error."

Has Mr. Bovey found this out by experiment, or does he take it on my showing? I think he has misunderstood me.

To avoid misleading any who might try the process, I stated the particulars, as we worked it for months successfully, not at all wishing to infer that the paper, &c., must be such, and none other.

I have toned with magnesia under very many different circumstances, not always with the same success; but when used according to the rules I laid down, I do not recollect a single failure. The only cause of failure that I know of as distinctive of the process, is the power that magnesia (the oxide) has, under some circumstances, of throwing down oxide of gold; but with good chemicals, and the precautions I mentioned, there is little danger of loss.

A carbonate might be made, I think, without the usual proportion of uncombined oxide.

I never said the bath would *not* tone without *heat*, but that we toned over hot water, and that if the bath was too cold it gave poor tones, and that slowly, which had reference to the winter just then over.

I *prefer* heat for toning with soda as well as magnesia; but on this point will give (if you will allow me) the words of two gentlemen whose opinions Mr. Bovey is bound to care somewhat for.

"Hints for December."—"All the solutions suffer by extreme cold."—Photographic News Almanac. "Toning Processes."—"Freshly made solutions, before the proper amount of decomposition is sufficiently set up by age, heat, or alkali, give mealy, flat results, which grow worse in the hypo."—*Ibid.*, 1865. "Hints on Toning, &c., by a 'Photographer's Assistant.'"—"The gold—still acid, remember—should now be placed into a porcelain cup or jug, and about half a pint of boiling water added. Stand the vessel on the fire a short time until it sings, when remove and pour into the toning-dish, into which the water has been previously added. The lime should now be added, and the bath is ready for immediate use."—*Ibid.*, 1866.

The same gentleman, in "The Reason Why," says: "What produces bleaching? Liberated chlorine. Then drive off the excess of chlorine by administering a dose of boiling water, and you destroy the active enemy."

As regards "alkalinity as the source of error," I have tried baths *neutralized* with magnesia, and emphatically give the preference to positive alkalinity; which, with carbonate of magnesia, cannot be very strong.

Do you know in what way carbonate of ammonia assists in the fixing bath? Is it better than carbonate of soda? If so, what would be the effect of hyposulphite of ammonia?—Yours truly, Ed. Seeley.

[Liquid ammonia is a fixing agent, dissolving chloride of silver. It is probable that carbonate of ammonia has a somewhat similar action. In conjunction with hyposulphite of soda, it certainly fixes more perfectly than the latter agent alone. We have no reason to expect a similar action from carbonate of soda.—Ed.]

SATURDAY HALF-HOLIDAY FOR OPERATORS.

Sir,—Would you allow me the privilege of a space in your Journal, to alleviate that which, if not exactly a grievance, is, at least, an indulgence denied all persons that are engaged by photographers. I allude to the Saturday half-holiday. There is now scarcely a trade or profession that does not enjoy some rest beside Sunday, and all assistants are well acquainted with the difficulty in obtaining any of the public holidays, as these are generally their most busy time. Will the employers consider this subject, and give their assistants some chance of enjoyment without breaking the Sabbath? And as it is now so universally bestowed, they can scarcely refuse. Trusting you will aid this suggestion, I am, Sir, yours, &c., A. E. C.

[We are always glad to advocate the interests of every branch of the profession, and we readily sympathise in the desire of operators for a brief weekly respite from duty for rest, recreation, or occasional essays in landscape work; but we can see that the very circumstance that Saturday afternoon is becoming very generally a holiday with the general public may become a reason why photographers should be at work at that time, as it is just the occasion when many, who have no other leisure, will avail themselves of the opportunity of sitting for a portrait. Is it not possible to secure a half-holiday on some other day less likely to interfere with the profitable exercise of professional duties?—Ed.]

IMPROVED DEVELOPER.

Sir,—Permit me to draw your attention to an improved developer, which has come to my knowledge within the last few months.

Being a printer in one of the largest firms in this town, I had noticed that the negatives were simply developed, washed, fixed, and varnished, without intensification. They are always of good printing density, as the enclosed prints will testify.

I enquired of the operator what he used to obtain such detail and density. He at once informed me that it was owing to the use of a developer made as follows:—

Protosulphate of iron	½ ounce
Epsom salts	1 "
Acetic acid	½ "
Water	16 ounces.

Being convinced, from the experience of the last few months, that the above is a great improvement on the old developer, and having obtained permission to submit it to you, that, if considered by you any improvement, it may be brought before the public, I remain, Sir, yours respectfully,

Northampton, July 31st, 1866. H. C.

[The print enclosed by our correspondent is indicative of a very brilliant negative.—Ed.]

Photographic Notes and Queries.

SINGULAR DEFECT IN ALBUMENIZED PRINTS.

DEAR SIR,—I have, during the last week or two, got into a peck of troubles while working with one albumenized paper.

I have not seen the spotted, fading appearance (which you will observe in the prints sent you) in any other prints except those printed on it. I at first thought it was carelessness in the fixing, and had every care taken with them, but they still presented the same appearance. I may here mention that I have all along used a new fixing bath for every batch of prints.

I mounted a number of the prints, but the damping, and the lying damp under pressure, seems to have added fuel to the fire.

In the interest of the art I send some of the photographs for your inspection. P. J. K.

Glasgow, 27th July, 1866.

[The unmounted prints received are slightly yellow in the whites, and, on examining them closely, a general mottling and marking with deeper yellow spots and lines may be seen. The mounted print is much worse; the whole print is discoloured, and has the appearance of a faded print, the blacks mottled with yellowish brown spots, quite distinct, however, in appearance from the effect of imperfect fixation. We are unable to determine the cause, unless it be some singular defect in the paper. Have any of our readers met with similar defects?—ED.]

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Talk in the Studio.

OBITUARY.—We have, with deep regret, to chronicle another vacancy in the ranks of the early workers in photography, by the death of Mr. Thomas Delf, better known to readers of photographic literature—to which the deceased gentleman was an extensive contributor—under his *nom de plume* of Charles Martel. An early experimentalist in the Daguerreotype process in the United States, and subsequently in other processes in this country, Mr. Delf, who had long been associated with the press, devoted himself considerably to photographic literature, which he commenced by writing one of the earliest manuals of photography published in this country. He was afterwards Editor of the *Photographic Art Journal*, during its brief career. He was for some time sub-Editor of a contemporary journal, and has for the last half-dozen years been associated with the staff of this journal. Mr. Delf was an able and industrious contributor to the artistic and scientific literature of this country, chiefly however, anonymously. He was the author of various works on art education, amongst which we may mention "The Principles of Form in Ornamental Art;" "The Principles of Colouring in Painting:" a "Dictionary of Terms in Art," which was illustrated by the late Mr. Fairholt, &c. He also translated the voluminous and profound work of M. Chevreul on Colour, one of the most valuable works which has been issued on the subject. Mr. Delf died in harness; he had been studying at the Reading Room of the British Museum on the day of his death, which was equally unexpected and sudden, being caused by the bursting of a blood vessel.

IMPROVEMENTS IN PHOTO-RELIEF PRINTING.—Mr. Woodbury has recently patented another improvement in his method of photo-relief printing which promises to be of much importance. It consists in a printing machine by which much greater rapidity will be secured, and facility afforded for producing much larger pictures. Instead of working with a flat plate, the intaglio will be formed on a cylinder faced with suitable metal, on which the sunken image will be formed by rolling pressure, in contact with the gelatine relief. One large image, or several small ones, will be impressed on one cylinder. The paper, revolving on rollers in a continuous length, will be pressed in contact with the cylindical intaglio, a reservoir with the gelatinous ink supplying the proper amount as the whole revolves. He is also engaged in experiments whereby he hopes to produce the prints in a fatty ink, by a method in which some of the principles of zincography are involved. Mr. Swan has also made an important discovery, whereby the gelatinous ink becomes absolutely insoluble, when once dry, without further treatment. Of this more hereafter.

PINHOLES CAUSED BY THE DEVELOPER.—Referring to the communication in our last on the effect of methylated spirit in the iron developer, Mr. H. P. Robinson remarks, that some time ago, on adding methylated spirit to an iron solution, considerable turbidity ensued, followed by a precipitate; and on applying this developer to an exposed plate, a general granular and foggy deposit was the result. This sample of methylated spirit smelt very rankly of the methyl. On recently trying another sample, scarcely distinguishable in smell from pure spirit, no such result followed. We have received from our correspondent "N" three bottles, containing examples of the solution with the crystalline deposit formed by the addition of alcohol and acetic acid. It is well known that from an aqueous solution of the ordinary protosulphate of iron ($FeO, SO_3 + 7 HO$) a less hydrated salt (generally $Fe O, SO_3 + 4 HO$) is precipitated on the addition of strong alcohol or acetic acid; but the notable feature of the experiments under notice is found in the fact that a copious crop of crystals is produced by the addition of methylated spirit, whilst no precipitate was formed by the addition of an equal quantity of pure alcohol.

ROYAL CORNWALL POLYTECHNIC SOCIETY.—We are favoured by Mr. J. C. Stephens, of Falmouth, with the following:—"It may be of some interest to your numerous readers to be informed in your columns that the Exhibition (34th) of this Society will open on Friday, the 14th of September, and that persons who may be desirous of exhibiting should communicate and make arrangements to send off their pictures, &c., so as to arrive here not later than Saturday the 6th. I will send you advertisement next week.

PEROXIDE OF HYDROGEN.—M. Weltzien states that the most delicate test for peroxide of hydrogen is chromic acid, which gives a blue compound, soluble in ether, and decomposable into oxygen and oxide of chromium. This, according to Barreswil, is perchromic acid.

GENRE CARD PICTURES.—We have received from Messrs. Weston and Son, of Dover and Folkestone, a collection of very pretty card pictures, consisting of some pretty girls in rural costume and occupation. As photographs they are exceedingly perfect, and the combination of a cleverly-painted landscape background, with genuine gates, stiles, &c., is very effective.

WHITE GLASS POSITIVES.—An Aberdeen correspondent says:—"I have to report to you that I have met with a very peculiar circumstance in re-developing or intensifying. I develop primarily with the usual proto-sulphate iron developer, and with the addition of the glycocine solution as made by Mr. N. K. Cherrill,—half drachm to six ounces solution. I then fix with cyanide of potassium, and thoroughly wash as usual. I next flood with a weak sherry-coloured aqueous solution of tincture of iodine, wash well, and then take the ordinary iron and glycocine developer; add six or eight drops of ten-grain silver solution, and flow on the plate, repeating and washing three, four, or even five times, if necessary. The peculiarity I wish to call your attention to is,—on carrying on this intensifying process, the negative—which, at commencement, showed thinnish, but with full appearance of high lights, &c., as a negative by reflected light generally does—gradually, under the intensifying, assumes the appearance of a beautiful positive by reflected light, all the half-tones well marked; and the dress, before light, becomes nice and black, as a positive would look; while, by transmitted light, it is a dense negative, and prints brilliant positives. Have you met with such appearance?" We have produced very brilliant glass positives, of which the whites had the appearance of frosted silver, by treating a finished positive with an old iron developer and a few drops of nitrate solution.—ED.

PHOTOGRAPHS OF THE HOLY LAND.—The photographs taken by the Palestine Exploring Committee will shortly be published. Mr. George Grove, the eminent Biblical scholar, is, it is stated, busily engaged with the committee of the Palestine Exploration Fund, preparing for publication the account of the exploring party, of which the photographs will form illustrations. These will be accompanied by the report, drawn up by M. Deutsch at the instance of the committee, on the palæographical and historical value belonging to some of the specimens submitted to him for examination.

PHOTOGRAPHY FOR REPRODUCTION.—It is stated that Messrs. Bell and Daldy are about to publish a series of about twenty photographs by Messrs. Cundall and Fleming, from so many of the finest impressions in the British Museum Print Room of Rembrandt's etchings. This comprises such famous works as "The Three Trees," "Ephraim Bonus, with the dark ring," and of the "St. Jeromes," "The Raising of Lazarus," "The Descent from the Cross," "The Appearance of the Angels to the Shepherds," and "The Hundred Guilder Piece." A letter-press descriptive text will accompany the photographs. The same publishers will issue at the usual season a Memoir of Mulready, by Mr. F. G. Stephens, illustrated by about sixteen photographs from the artist's most famous pictures.

Thames Embankment. — The foundation-stone of the Southern Embankment was laid on Saturday last, and photography was employed to secure a memorial of the ceremony. A daily contemporary says:—"The company brought together on Saturday, by invitation of the Metropolitan Board of Works, found themselves in a vast cofferdam, above the outer boundary of which, and therefore a great height over their heads, towered the funnels of steamers, and the masts and spars of barges and small river craft. The great pressure caused by the weight of the water was plainly apparent in the little circumstance that the ends of the long raking struts were pushed for an inch or two into the waling timbers. It required, therefore, some confidence in the strength of the dam to take one's position gracefully in the numerous group of guests who, on entering, had received each a little pink piece of paper, on which was printed a polite request that they would assist at the composition of a photographic picture by keeping their manly forms in steady attitude while the operator's lens was turned upon them."

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To Correspondents.

W. (Aberdeen).—We have examined the sample of nitrate of silver enclosed, and see no reason to doubt its purity. The milky turbidity you describe must have arisen from the presence of chlorides or carbonates in the water, as on dissolving it in pure distilled water no such turbidity was produced. 2. In evaporating a bath to dryness, the black impurities which appear are due to organic salts of silver, which are reduced by the heat. We do not quite understand you when you state that continued application of heat does not enable you to evaporate the solution to dryness, but that "it sets at once on colouring." It would appear that you have driven off all the moisture, and continued the application of heat until the nitrate became fused. 3. There are various modes of eliminating copper from nitrate of silver. One consists in fusing the nitrate, and maintaining the heat until the copper is thrown down as an oxide. Another and a better plan consists in rubbing the nitrate in a mortar with a little oxide of silver, then adding distilled water and boiling the solution. The oxide of silver will displace the copper, which is thrown down as an oxide. The solution is then filtered, and a little nitric acid added to neutralize any alkalinity from oxide of silver; or, a little caustic potash may be added to a solution of the nitrate containing copper, then boiling, filtering, and acidifying. In the latter case, however, a little nitrate of potash will be left in the bath. 4. We have, many years ago, treated positives in a manner analogous to that you describe, and have obtained very vigorous, brilliant pictures, of which the whites were like matt or frosted silver. The fact is worth noting again.

A. J. B.—A patent was taken a few months ago for a method of producing magic photographs. What the exact details claimed may be we cannot at present say, but the method by means of bichloride of mercury, &c., was published many years ago by Sir John Herschel, and is now public property. 2. The engravings in *Punch* are the copyright property of the proprietors of that periodical, and cannot legally be copied without permission, which, however, it is probable, could be obtained.

Glasnevin.—When glass has "sweated," the surface is actually decomposed, and it will be difficult to secure a perfect polish again. We have removed the coating of decomposed vitreous matter by means of a dilute solution of hydrofluoric acid, which must be very quickly washed off again, or it will attack the glass still further. Remember, this acid is very dangerous to use, quickly producing dangerous ulcers if it touch the skin. We have seen it recommended to cover a piece of wood with felt, and with this as a rubber, and a paste of rouge, remove the film from the surface by polishing. The mixture of chromic acid and sulphuric acid, obtained by Mr. Lea's recipe, is, we believe, an excellent detergent for dirty and stained glasses, but will not be suitable for glasses which have sweated. We shall be glad if any of our readers know of a better method for dealing with sweated glasses than we have mentioned.

Nemo.—The plan proposed by Dr. Schnauss is to prepare paper with plain albumen, without any addition of chloride whatever. He considers that the albumen itself contains sufficient chloride to secure, in conjunction with the albuminate, sensitiveness. His paper might have been more explicit on this point with advantage. His nitrate bath is similar to that first proposed upwards of two years ago in our columns.

J. Schofield.—The details of the method of fuming excited paper would occupy too much space for repetition in this column. You will find them very fully stated in several articles in our eighth volume. They are also fully given in our Year-Book for 1865. 2. It will probably be better to suffer a little loss of light than be subject to overlooking in a professional studio. Possibly corrugated glass will answer your purpose best. 3. The addition of citric acid to your discoloured silver bath caused a precipitate of citrate of silver, which, in falling, carried with it the colouring matter.

An Amateur.—As ammonia is very volatile, the solution of carbonate of ammonia had better be made fresh for use, and added to the hypo when required. 2. The action of light will not injure an unused solution of hypo, but will assist in decomposing a solution containing salts of silver. There is no danger from an ordinary artificial light. 3. It generally happens that toned prints, on their first immersion in the hypo, turn somewhat red, and afterwards recover their deeper colour; but this does not necessarily imply that the recovery of colour is due to the action of sulphur. It is only when the prints are a little blacker in tone on leaving the hypo, than when they were immersed, that sulphur toning is to be suspected. To avoid the latter, be certain that the hypo bath is never acid. 4. To preserve the paper from discolouration after exciting, the simplest plan is to roll it tight on a roller, and so preserve it from the atmosphere. If it be rolled albumen side outwards, there will be no difficulty in afterwards working with it. A slight discolouration in the paper before printing is often removed by the use of fresh, strong hypo in fixing. 5. It is very difficult to reduce an over-printed picture on albumenized paper without a somewhat mottled, uneven effect. The best method we know, consists in immersing the over-printed picture in a solution consisting of five grains of cyanide of potassium and one grain of chloride of gold in ten ounces of water. 6. The whitish deposit on the face of the prints during toning is due to chloride or carbonate of silver. It is desirable to remove it, as it sometimes interferes with regular toning. 7. It is very difficult to wash a print properly by merely allowing it to remain in changes of standing water. Agitation, or friction, or draining, is necessary. A little washing with a sponge is good; constantly running water is good; but there is nothing better than carefully draining each print between every change of water. Twelve changes of water, with draining between each, given at intervals of half an hour, will produce very thorough washing. The pressure you describe is also good. 8. The metallic spots are defects in the paper.

J. B.—A copy of Hogarth's works is worth about £5 or £6. It is possible that a well-executed series of photographic copies would sell; but it is impossible to speak with certainty without trying the experiment. Much would depend upon the size, style, and mode of introduction to the public, as well as upon the excellence of the photographs.

W. H. Y.—The strength of the India-rubber solution employed by Mr. Swan is ten grains of india-rubber to an ounce of benzole. The solution is about as thick and viscous as boiled linseed oil. Some samples of india-rubber are more difficult to dissolve than others. It should be cut up into fine shreds; and if it be difficult to dissolve, it will be found that if a little chloroform be poured over it, sufficient to make it into a paste, it will then readily dissolve in the benzole. The proper mode of applying this solution to the mounting paper and the gelatine tissue is by floating, or rather drawing, the surface to be coated over the surface of the solution, which is contained in a flat dish. The two coated surfaces are suffered to dry, and then, when pressed together, they adhere perfectly. In experimental operations, the solution may be applied to the surfaces by means of a flat camel-hair brush.

Hypo.—The best mode of recovering the silver from any solution containing hypo is to throw it down as a sulphide, by means of liver of sulphur; or, you may recover it as metallic silver, by placing a plate or two of clean plates of copper in the solution.

E. E. How.—We ascertain that the medallions of which you sent photographic copies last week belong to a series known as the *Poniatowski Gems*, a collection brought from Cracow about the close of the last century. Many of them are very excellent. The head of Mercury you send, which is from an onyx, is very fine.

Amitie.—Your suggestion is doubtless good, and we carry it out where it is possible; but in many cases the proprietors would object to the publication of such details. 2. The accuracy of your argentometer can only be ascertained by carefully testing it with carefully prepared new solutions. If you find, on testing it with a solution of a given strength, that it does not sink deep enough, according to the graduations marked, you may, by weighting it a little more, cause it to sink to the mark; if it sink too deep, the best plan will be to rectify the graduation by means of a writing diamond. It is an unfortunate fact that the graduation of such things is often a little imperfectly done.

J. Maycock, R.N.—The markings you describe most probably arise from the film at one end of the plate becoming too dry before immersion, a circumstance requiring care to prevent when working in a hot climate. In such case, the dry parts do not get perfectly sensitized, and thus cause marks. Sometimes markings of the kind arise from the collodion being over-iodized, but in that case they are seen at the end of the plate from which the collodion is drained. 2. We prefer a bromo-iodizer. You will find a great advantage in adding from half a grain to a grain of bromide of cadmium to each ounce of your collodion. A little free iodine in the collodion is not injurious when a bromide is used. Almost all the popular makes of bromo-iodized collodion work well. The carbonate of silver formed by the water you mention will filter out of the solution, which will then be no worse. 3. You may use a 30-grain bath with safety in hot weather, but it should not be stronger. 4. You will probably find advantage from the use of a somewhat weaker developer with more acid. Try 15 grains of protosulphate of iron and 20 minims of glacial acetic acid in an ounce of water. 5. It is quite impossible to state generally what the time of exposure should be, without knowing the focus of the lens and the aperture, as well as the kind of subject, &c. We will notify your request to our advertising manager.

B. B.—Thanks. We shall have something to say on the subject in our next, and shall then make use of your communication.

Sol.—Thanks.

J. C. Stephens.—Thanks. We shall write to you shortly.

St. Fillans.—We are obliged by the statement of your experience, and shall shortly recur to the subject.

N.—We are obliged by both communications. The illustrations of experiments are interesting and suggestive. After carefully examining, we will return them as desired.

S. (Glasgow).—We have examined the prints carefully, and cannot suggest any reason for the perplexing defect, except some singular fault in the paper. From an error in the address, the communication was delayed in reaching us.

Village Green.—It is probable that the smell is due to the decomposition of organic matter in the water when it has stood long. Try the addition of Condy's fluid, which you will obtain from a chemist, with instructions. This will probably purify the water, and will not be injurious for washing purposes, &c.

Received.—"Chemical Addenda," by the Rev. B. W. Gisborne, M.A., &c., and Stereographs of Whitby Abbey, &c.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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THE KEEPING PROPERTIES OF GORDON DRY PLATES, ETC.

Since our publication of the details of Mr. R. Manners Gordon's modification of the albuminate of silver process, about three months ago, we have received many communications detailing various experiences, for the most part highly favourable to the process, and thanking us for its publication. The chief drawbacks have been in some hands an occasional tendency to a slight deposit of red fog (which, without destroying, injured the negative) and uncertainty as to the keeping qualities of the prepared plates. We have one or two words to add on both points.

Regarding the occasional tendency to a red deposit. We received some weeks ago a communication from an esteemed correspondent, writing under the *nom de plume* of St. Fillans, speaking in very high terms of the process, but mentioning the occasional occurrence of this trouble. We recommended, amongst other modes of avoiding it, the avoidance of prolonged application of the plain pyro developer, and the use of a large proportion of citric acid, in the process of intensifying. We received in a few days the following:—

> I thank you very much for your hints in reply to my last, regarding Mr. Gordon's collodio-albumen process. "Rem acu tetigiste," I suspect. On looking into my dropping-bottle of citro-silver, I found a deposit of what I suppose must be citrate of silver—an insoluble, white, flaky deposit. A plate which I tried the other day, and which, in consequence of a sudden gust of wind blurring the foreground, I did not wish to keep, was fixed, with hardly any attempt at intensifying, and it came out perfectly clear, while in one or two previous trial plates, in which I pushed the development the farthest, the evil I complained of was the greatest. I do not think I have made any mistake in the other points to which you refer, and so I must hope that a weakened citro solution has been the cause of my trouble. Is not the deposit of citrate of silver unusual? I dissolve the citric acid and nitrate in separate water, and, after mixing, apply a little gentle heat, and yet there, after all, is the deposit.
>
> Again thanking you for your kind attention, I remain, dear Sir, yours very truly, St. Fillans.
>
> P.S. The film of the negatives in which intensification was pushed, instead of being grey, is of a bright amber colour.

The difficulty was here clearly traceable to insufficient acid in the silver solution used in intensifying. But this subject demands a few words of comment. The addition of citric acid to an ordinary solution of nitrate of silver, containing a trace of free nitric acid, produces no apparent effect, the citric acid is dissolved, and the solution is made proportionately acid. If, however, the silver solution be in the slightest degree alkaline, or even quite neutral, a precipitate of citrate of silver is generally formed. But in solutions in which no such precipitate is produced at first, a gradual deposit is often found to accumulate. Hardwich, speaking of a solution containing twenty grains of citric acid and twenty grains of nitrate of silver to an ounce of water, says: "The keeping properties of this solution are not remarkable, a warty substance of unknown composition sometimes forming." Mr. Gordon, noticing this tendency, made it a practice to prepare his solution with thirty grains of citric acid to twenty grains of nitrate of silver, and this solution he found not only kept better, but relieved him from any tendency to fog during the process of intensification. On the question of exact proportions and the influence of temperature, the next letter from the same able correspondent contains some interesting suggestions. He says:—

> My Dear Sir,—Perhaps you may wish to know my further experience with Mr. Gorden's collodio-albumen process. You certainly sent me in the right direction when you suggested an increase of citric acid. I have succeeded in banishing the brown foxy fog from the plates. My plan is to make separate solutions of silver and acid; the first thirty grains, the last forty grains. For every two drops of silver, I used four of acid. I got with this the shadows out in the deepest parts like clear glass. But while I have thus succeeded, I am persuaded there are uncertainties about the process, which should make amateurs careful about employing it as the only one in use by them. It is manifest that the solution in developing must be managed with the greatest delicacy. Obviously, both the plain and the acid pyro act according to the exact temperature at which they stand at the time of development. I have evidence of the risk of the least deviation from the exact proportions between the two to be observed at different temperatures. Yesterday I developed a plate, and the picture was perfect in detail and shadow. I tried another, which had been made at the same time, and was, in every respect, identical with it. I developed this immediately after the former, under precisely similar circumstances; unfortunately, I put in three drops of silver, instead of two, and without thinking at the moment, went on, and I very soon found my old enemy—fog—in the ascendant again.
>
> My conclusion is to adhere to Mudd's collodio-albumen as my sheet anchor for the summer, and to resort to Gordon's modification, from time to time, when I am anxious for a rapid plate, and now and then to use it, early and late in the season, when the temperature is more steady and something like certainty attainable in managing the solutions.—Ever yours,
>
> *25th July*, 1866. St. Fillan.
>
> PS.—In the above experiment, I may mention that the plain pyro was on the plate fully longer in the first case than in the second, so I feel sure the damage came in the intensifying.

It should be observed here, as we have often before remarked, that in proportion to the sensitiveness of a plate to the action of light, so, as a general rule, is its sensitiveness to any variation from the normal conditions appropriate to it. A sensitive process depends upon a nice balance of the various re-agents employed, and any violation of that balance will injuriously affect the result. Mr. Gordon's experiments were conducted in the spring, and the formulæ, it is very probable indeed, would require an adjustment to the exigencies of an exalted temperature. We have before remarked, moreover, that much of the success of Mr. Gordon, in producing some of the most perfect photography we have ever seen, depended upon the exquisite precision of his manipulation, the rigid exactness of his attention to formulæ when once he had ascertained which was best, and his scrupulous cleanliness in every stage of the operations. On the effect of temperature, Mr. Keene's recent communication in our columns is instructive, an increase in the heat of the solution at once producing fog where it was absent before.

This brings us to the question of keeping qualities. Mr. Gordon himself doubted the keeping qualities of his plates. Mr. Keene finds, in testing the keeping qualities of these plates and those by his own process, described in our columns three months ago, that after nine days' keeping, the Gordon plates, developed after the fashion originally prescribed for them, develop without fog; but that after keeping a month, a little fog follows the same treatment. Modifying the development, however, by the use, at the outset, of a trace of citro-silver solution, the plates which have been kept a month yield perfect negatives. For other details, as to the relative sensitiveness, &c., of these and of his own plates, we refer the reader to Mr. Keene's instructive article.

Another able correspondent, from whom we have received, from time to time, communications on Mr. Gordon's process, is disposed to think that Mr. Keene somewhat underrates the keeping qualities of the plates, and suggests that it should be borne in mind that every operator is most successful with the process he has practised most, and that as Mr. Keene has probably prepared many hundreds of the plates by his own method, they possess an advantage from that cause in the comparative tests. This correspondent, who signs "B. B." has been successful in all respects, and especially in the keeping of Gordon plates. He sends us, with a recent communication, half-a-dozen prints from plates prepared during very hot weather, and kept a month before exposure. The results are as perfect as could possibly be wished; in delicacy, softness, detail, and brilliancy, they surpass three-fourths of the prints we see produced by wet collodion negatives. We subjoin some extracts from his letter.

Dear Mr. Editor.—You must not allow the keeping qualities of these plates to be underrated too much, because I have proved their keeping qualities rather severely. As I have told you before, I have one plate by me yet, that was prepared the same week you published the process. After I read Mr. Keene's recent communication in the News, I thought I would just see if the plates which were prepared during that very hot weather, about a month since, were deteriorated; so I started off with half a dozen plates, and now I send you the result. You will perhaps remember that this day week was a very hot day, when they were exposed. I was very much pleased to find after I arrived home, upon developing, that I had no signs of any fog or any quality I did not want; but on the contrary, I found them develop in every way as well as any plate possibly could. I got six as good negatives as I could wish for, even with any wet process. I should very much like you to see the negatives, but I cannot very well send them to you; they have the appearance of beautiful iron negatives. The large square white house is, as you will see, all white (even the roof was white), and the white shutters nearly all closed, and the sun was shining full upon it. But for all that, as you can see, the Gordon plates have brought out both this and the foliage perfectly. I should have hesitated to have taken it in such a light with the wet process. The small white house with the water in foreground has not come out as might have been feared, like a white patch, although it has a very white stucco wall all round, and the sun shining bright upon it; a great deal of the foliage was in shade, but, as you will see, no detail is lost. Upon the whole, I believe the negatives are a credit to any dry process; but you must judge for yourself. I have not exposed any since these, but have a lot ready for the first favourable day, when you shall hear from me again. B. B.

Epping, July 27th, 1866.

The results sent us by "B. B." are so perfectly satisfactory that we shall look with interest for his further experiences and specimens, and we shall be glad if he will favour us at the same time with details of exposure, and of points of manipulation, if any, in which he may diverge from the ordinary practice, as it is by the record of practical experiences that real progress is promoted.

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THE SHELLAC PRINTING PROCESS.

We have been favoured by Mr. Arthur Taylor, of Marseilles, with some fine examples of the results obtained by the shellac printing process, an account of which he forwarded for publication in our columns in May last. The especial claims which this process has upon attention are—first, the probability of permanency. Unlike albumen, shellac is a very permanent body, and gives hope, *à priori*, of preserving rather than assisting in the change of the particles of silver forming the image, and which are here enveloped in the resinous coating. Mr. Taylor has, moreover, used this process exclusively for three years, and prints obtained at the commencement of that period have remained perfectly unchanged until the present time. Secondly, it has claim to attention on the score of beauty of result. The prints are equally free from the vulgar gloss of albumenized paper and the dulness and want of transparency of plain paper; the texture of the prints possessing a quality highly satisfactory to artists.

The prints before us are some of the most charmingly artistic landscape pictures we have seen for some time. They are chiefly printed on rough drawing-paper, and possess much of the quality for which water-colour artists prize this kind of paper. The tones of the prints vary from a rich bistre tint to a deep sepia, according to the treatment they have received. It is very difficult, indeed, in examining some of them, to avoid the idea that they are very high class drawings in bistre, the absence of glaze and the peculiar texture of the paper so essentially removing all photographic suggestion. The admirable selection of light, and the artistic feeling which have characterized the negatives, materially assist in producing this impression. Those prepared with a mixture of the biborate and phosphate of soda and shellac, and, after printing, submitted first to a bath of sulpho-cyanide of ammonium, and then to a solution of hyposulphite of soda, and those submitted to the same treatment, but prepared with biborate of soda alone, present varied tints of bistre, which, for landscape and architectural subjects, are very pleasing. Those prepared with phosphate of soda and fixed in hyposulphite of soda only have a deep sepia tint. The dates attached to the prints show that some of them have been executed twelve months and others a few weeks. In point of purity of colour, those which have been kept a year are equal to those more recently printed, and show no trace of change whatever. One of the pictures has been treated with a thin varnish of shellac dissolved in alcohol as an additional aid to preservation. The effect of this on the print is to heighten slightly the effect of brilliancy and transparency without giving an actual gloss, or vulgarizing the artistic effect of texture produced by the rough drawing-paper.

We are altogether highly pleased with these results, and commend the process to our readers as especially adapted to landscape and architectural subjects and to large portraiture. We hope shortly to place more detailed formulæ before our readers, and in the meantime refer them to Mr. Taylor's communication, p. 256 of the present volume of the News.

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A REGAL PHOTOGRAPHIC ESTABLISHMENT.

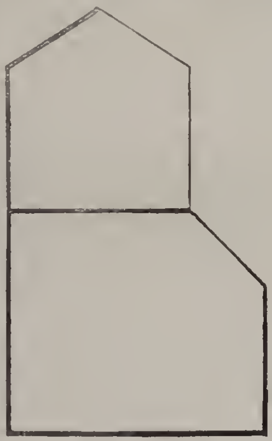
We have recently visited, at Ryde, the photographic establishment just erected by Mr. Jabez Hughes, which, in design and execution in every department, is perhaps the most perfect, both as regards beauty and convenience, which has ever come under our notice. Instead of being, as in most instances is the case, an existing building modified by additions and alterations to suit the purposes of the photographer, this is an entirely new erection, from the foundation to the tower, on an admirable site, of a noble building, every detail of which has been carefully designed for the end it is intended to fulfil, without regard to any consideration except the securing of the most perfect result. To describe all the minutiæ of such an establishment, so as to fully set forth its completeness, would more than fill one number of this journal; but a brief description of the general features cannot fail to interest our readers.

Leaving the pier at Ryde, and entering Union Street, the principal thoroughfare in this pretty town, the eye is met by a building, about half-way up on the west side, which towers high above all others in its neighbourhood, which seem dwarfed by the proximity of the new erection. This building, which is of Portland stone and white brick, has a frontage of thirty-five feet, with four lofty stories, which are surmounted by a handsome Belvedere or Campanile tower, which commands a charming view over the Solent sea, with its summer fleet of white-sailed yachts, iron-clads, &c. On the basement is the reception-room or gallery, the front of which is of Portland stone, ornamented with Corinthian pillars of Cornish marble and columns of bronzed iron. The stone is ornamented with carvings, the designs of which are all formed of the sunflower in various stages of bud and blossom, ornaments of the same flower being interwoven with the acanthus leaves on the capitals of the marble and iron columns, in some cases the design being varied by monograms of the initials of Mr. Hughes, which are skilfully combined with the floral designs. Two windows, each formed of one plate of glass ten feet by eight, in massive mahogany frames, with a handsome entrance between, complete this part of the frontage. Above, forming the front of the first floor, are two magnificent bay windows, the whole frame-work of which consists of wood ornamented with marquetry, and above the private entrance a very pretty oriel window, surmounting the pointed roof of which is a gilt sunflower. Ornamenting the top of the fourth story, in front of the Belvedere tower, are four life-size stone figures representing the four seasons.

Entering the reception-room, which is very lofty, and about twenty-eight feet square, we are struck with a feature which pervades the entire building, both in the business and residential portions,—there is no painted wood: everything of wood-work in the interior is of polished red and yellow deal. This is indeed one leading characteristic of the whole,—everything is real; there is no stucco or sham. The cornices in the sitting-rooms are of carved wood, not plaster. Where wood is used, it is finished as wood; where metal is used, it is treated as metal; and stone as stone; each is ornamented in its own kind, and never plastered or painted so as to appear something else. The reception-room is fitted with counters and glass cases of polished deal, a large stock of photographs, all carefully classified, being kept in the latter. In the windows, specimen photographs are arranged on standing easels; the walls are also similarly furnished. Above the line of sight, the walls are ornamented with some fine plaster casts in *bas relief*, amongst the subjects of which are, "The Horses of the Sun," from the Arch of Constantine; Thorwaldsen's "Night and Morning;" "Minerva introducing Art to Photography;" Bacon's "Four Elements;" the Arts and Sciences, and several other characteristic subjects.

Leading from the reception-room, opposite the main entrance, is a noble arched corridor five feet wide and thirty-seven feet long. Branching from this corridor, on the left, are two or three elegantly appointed dressing-rooms. On the right, but only accessible or seen from another point, is the mounting-room. Passing through this corridor, we enter a charming conservatory, already supplied with a rockery and rare collection of the fine ferns with which the Isle of Wight is well known to abound. From this conservatory we can enter a very prettily arranged flower-garden, which runs along by the side of the studio, and is seen from its window. Instead of entering the garden, however, we proceed straight forward into the principal studio, which is thirty-five feet long by eighteen feet wide, very lofty, and handsomely furnished. Cabinets, tables, chairs, &c., in carved wood of various designs, although numerous, do not produce disorder or crowding. The walls, floors, &c., are of a quiet grey tint: and although the weather was hot, this room had a cool, refreshing influence, both in temperature and appearance, very unlike the suffocating effect of a studio built entirely of glass, exposed at the top of a house to the full blaze of a summer sun.

The dominant light in this studio is such a combination of top-light and side-light as constitutes a high side-light; direct front-light and absolutely vertical light being excluded altogether. The aspect of the windows is north, no direct sunlight finding admission. The south side and roof of the room, as well as each end, are without any windows. Each end of the room is provided with backgrounds, and either end can be used with advantage. White reflecting screens are sometimes used; but, as a rule, great variety of lighting can be obtained; by slightly adjusting the position of the sitter in relation to the light, it is possible to produce almost any effect of light and shadow upon the face without much arrangement of blinds. Although there is nothing of the character of the tunnel, or dark recess, the room being arranged with comfort, there is no oppressive glare of light, notwithstanding that the exposures are very rapid. Above this studio is another of about the same length, but only twelve feet wide. The diagram presents a section of the rooms, and will enable us to explain the mode of lighting.



The lower half of the diagram represents the end of the studio on the ground-floor, and the upper, that of the studio above it. The portions indicated by black lines comprise the opaque parts, and the portions indicated by lighter lines represent the glazed parts. In each instance the side-lights are of clear glass, and top-lights of fine corrugated glass, running from end to end of each room. The glass is, in all cases, in very large panes. Those in the roof of the lower studio are 7 ft. 4 in. long by 2 ft. wide, the panes in the side-light being 7ft. 4 in. long by 6 ft. wide. Those in the roof of the upper studio are 7 ft. 2 in. long by 2 ft. 3 in. wide; and in both rooms there are ready facilities for opening the windows, so as to secure not only ventilation, but the effect of open air lighting uninterrupted by glass. The only blinds required are curtains running on a rod, so as to shut out portions of the side-light when necessary. It will readily be seen that, with such a flood of north light, working is rapid and the arrangement convenient. With smaller rooms than these, lighted in the same manner, whilst general and uniform excellence of lighting is easily secured, much variety is not attainable; but here, by a slight alteration of the position of the sitter and of the camera, any effect, from direct front to direct side-light, may be obtained, the ample size of the lower studio permitting the camera to be taken almost all round the sitter.

Returning to the ground-floor, we pass out of the studio at the further end into the best dark-room we ever entered. It is a lofty room of some twelve or fourteen feet square and over fifteen high. A large sink occupies one side of the room, above which are two windows, each six feet high by three feet wide. These are provided with double sashes, one glazed with yellow and the other with white glass, the former being readily pushed up so as to admit white light, and both being readily pushed up so as to admit fresh air. Instead of yellow glass for the admission of non-actinic light, the glass is first covered with yellow paper, and then treated with several coats of yellow varnish. The room is perfectly and freely illuminated in its darkest corners, but no actinic light finds admission. Underneath the sink is a large wooden vessel, into which, through a tube which passes from the sink to the bottom, the waste developing solutions pass, the silver in which will be precipitated at the bottom, whilst the supernatant water passes off from time to time at the top. The room is shelved round to hold necessary articles, but no lumber of any kind is permitted to accumulate in the dark-room. We may mention, in passing, the kind of tap, which we have before seen in one or two dark-rooms, but which would be found convenient in all; it consists of an arm about twelve inches long, which is turned on by the act of pulling it forward, so as to flow conveniently over the negative, and turned off again by the act of pushing back against the wall. Passing out of this room, we enter another, devoted to plate-cleaning, varnishing, &c. For the purpose of heating the negatives for varnishing, a Bunsen's burner is employed, surrounded by a conical metal chimney, which preserves the negative from contact with the flame.

A portion of the inner walls of the dark-room is only twelve feet high, a space of three or four feet intervening between the wall and roof, an arrangement which permits ventilation without admitting light: there is a grating also in the floor of the dark-room, beneath which is a ventilating chamber, which permits the heavy vapour of ether, &c., to pass readily out of the room. Instead of the mixed smell of acetic acid, ether, &c., so common in dark-rooms, this room, after a few months' constant working in it, is as free from smell of any kind as an ordinary well-ventilated sitting room.

A spiral staircase leads us to the printing-room on the first floor, where a bench runs along underneath a yellow window, in which, through a series of apertures with self-closing doors, the frames are pushed out to a shelf outside for exposure, and drawn in for examination. Communicating with this room, is a large flat, about twenty-four feet by eighteen feet, upon which a very large number of frames can be exposed when necessary. A toning-room adjoins, with every convenience for saving the residues from the various solutions. Returning from the suite of rooms on the first floor down another staircase, we arrive at a convenient store-room, in which stock of all kinds is kept; and some other rooms for various purposes. We then reach a most convenient room, in which mounting, rolling, retouching, &c., is conducted. One side of this room is covered with an extensive series of pigeon-holes, in which the negatives are kept, in preference to boxes or racks. Each negative is wrapped in a white paper envelope, on the outside of which is the name of the sitter and a number, the latter corresponding with the number of the pigeon-hole, several negatives bearing one number. An alphabetical register of all the negatives gives the number of the pigeon-hole in which the negative is readily found. This system prevents the inconvenience arising from the rapid and almost indefinite extent of the numbering where each negative bears a progressive number.

The whole of the establishment is provided with hot-water pipes for heating in winter, not less than 2,000 feet of pipe running through the establishment, in which are 500 gallons of water. By this system it is possible in winter to raise the temperature of every room in the house to 56° Fahr. in a space of from one to two hours. Speaking-tubes connect every department of the establishment with each other, and promote the rapid and convenient transaction of business. The residential portion of the establishment, which forms part of the same building, is in all respects as perfectly designed and arranged.

Our description, intended to be brief and general, has already extended to too great a length, without the possibility of our referring to the ingenuity and perfection of the mechanical arrangements, to the elegance and excellent taste of the fittings and internal equipment, or to the thousand and one details upon which completeness depends, and which constitute "Regina House" a regal photographic establishment in more than name, and which render it, to quote the remark of Mr. Mayall after examining the whole, a Monument to Photography.

Critical Notices.

THE OBERLAND AND ITS GLACIERS: Explored and Illustrated with Ice-Axe and Camera. By H. B. George, M.A., F.R.G.S. With Twenty-eight Photographic Illustrations, by Ernest Edwards, B.A. (London: Alfred W. Bennett.)

At the latter end of the summer of 1865, a party of tourists, consisting of nine persons, assembled at Grindelwald, with a view to pursue pleasure and science in an exploration of the Oberland. The heterogeneous materials, we are informed, of which the party was formed, were united by a central element into a manageable and concordant whole. The centre round which all else revolved was a photographic camera. This camera had a specific duty to discharge, and all the movements of the party were governed by the necessary arrangements of the camera. The photographer, Mr. Ernest Edwards, the author states, may be appropriately designated by the Fenian title of Head-Centre, since he supplied the brains to the material centre—the camera. We have a photograph before us of the party and three attendants, assembled on the edge of the Unter-Grindelwald glacier; the photographer himself, unlike Boyle Roche's bird, being unable to be in two places at one time, is not included in the group, which he photographed. At the foot of this glacier the camera commenced its work at the beginning of September, and proceeding round the Oberland, finished its work, the results of which are before us, in a month.

Familiar as Alpine photography and records of Alpine rambles have become of late years, this familiarity has been of a somewhat superficial character, and the author of this work—the editor of the *Alpine Journal*—expresses his conviction that people who have never seen a glacier are unable, from the published sources of information, to obtain any clear idea of what a glacier really is. He conceived, therefore, that by obtaining a "set of photographs which should show as completely as possible the nature of glaciers and their various appendages, and by writing such an account of them as should supplement the effect of the pictures," he would serve a useful purpose. Whilst preserving this aim in view, the author presents us with a very pleasantly-told narrative of the rambles, dangers, and adventures of the party under his charge.

Mr. Edwards is, as most of our readers know, an excellent photographer, and his work, much of it done under serious difficulties, is admirably executed, the photographs far surpassing the average of photographic book illustrations. Many of the troubles connected with the successful photographing of such a series as this before us may be conceived; but let the reader picture to himself the pleasures of photography under the circumstances described by Mr. Edwards in the following paragraph, and he will be the more ready to appreciate the excellence of the work done:—"The two photographs entitled the active and extinct moulins were not captured without some little risk. In the former case, I had to be let down into the bed of the glacier stream, with the pleasant reflection that at any moment a large boulder, some of which are seen lying about, might interrupt my proceedings. In the latter, a way had to be cut in the ice, and both camera and artist had to be held (the latter by his coat tails), for fear of both disappearing for ever."

The primary aim in the photographs obtained, with the especial view of the author, is of course scientific accuracy, and in this respect the perfect definition, exquisite detail, the delicacy and brilliancy of Mr. Edwards' work leave nothing to be desired; whilst on pictorial grounds much higher claim might be made in many instances than is made in the book. Mr. Edwards says:—"For subjects in which picturesque effect is not expected, where nothing is required but a simple reproduction of the facts of nature, the photographic art is perfectly adapted; in pictures of a more ambitious kind she must be content with more qualified success, with accurate representation of form, and such truth of effect in light and shade as can be obtained by a judicious choice of direction, and proper management of her chemical instruments."

Some interesting details of the equipment and tent employed are given in the "notes" appended by Mr. Edwards, to which we shall probably make a future reference.

The photographs are well printed and neatly mounted on toned paper, similar to that on which the book is printed. The whole is beautifully printed and bound, and forms one of the most handsome quarto volumes we have seen for some time.

CHEMICAL ADDENDA: Being a Brief Exposition of the Salient Features of Modern Chemistry, designed as an Appendix to Elementary Text-Books of the Science. By the Rev. B. W. Gisborne, M.A., F.C.S., &c. (London: J. H. Dutton, Wine Office Court.)

Students of Chemical Science are aware that for some years past Chemistry has been in a state of transformation, and that new formulæ, new modes of classification and of notation, have been superseding the old system. Hence, as Hofmann remarks, "the domain of Chemical Philosophy has for many years past rather resembled a tumultuous battle plain, than a field bestowed by nature for peaceful cultivation by mankind." "It is only," he adds, "within the last few years that the new doctrines have acquired a logical consistency, and a consequent ascendancy throughout Europe, auguring at length a period of comparative calm."

The object of the little work before us is to present succinctly to the student the changes in the theory, notation, and nomenclature to which we have referred, and to place before him a general statement of those facts which distinguish modern chemistry from the system it is designed to supersede. This is done with equal simplicity and completeness, qualities that strongly recommend the brochure to the student.

THE SILVER SUNBEAM: A Practical and Theoretical Text-Book on Sun Drawing and Photographic Printing. By J. Towler, M.D. Fifth Edition. (New York: Joseph Ladd; and London: Trübner & Co.)

Our readers already know our high opinion of Dr. Towler's work as a manual of photography, and it affords us much pleasure to call attention to the issue of a fifth edition, containing about seventy pages of additional matter, chiefly relating to the most recent processes and modifications which have taken a place in the general practice of the art, thus adding still more to the completeness of one of the most complete books. We extract a chapter from the Appendix as an example of the admirably clear and simple instructions of the author:—

WHAT TO DO WITH WASTE RESIDUES OF SILVER AND GOLD.

Silver in an Old Nitrate of Silver Bath.

From the fact that an old nitrate of silver bath contains several other compounds besides that of silver, such as nitrate of the oxide cadmium, of soda, of lithia, of ammonia, of potassa, &c., the first part of the process consists in separating the silver compound from the rest. This can be effected easily in two different ways:—

First Method.—Decompose the bath solution by a solution of common salt, which produces the insoluble chloride of silver in the form of a white deposit. Continue to add of the salt solution as long as any white precipitate is produced. Finally, allow the deposit to settle, and then pour off the supernatant clear liquid. Now throw in water and stir the deposit well up, and set the mixture aside to settle. When the chloride has thoroughly settled, pour the water off, and again add fresh water. Stir the mixture up, and again set it aside to settle. This operation of washing the chloride can be repeated several times. Finally, the deposit is poured upon a sheet of thick, white blotting-paper, and set aside in a warm place to dry. Preserve the chloride of silver in the dark-room until a sufficient quantity has accumulated for reduction.

Second Method.—Add solution of caustic potash or of lime to the bath as long as there is found a brown precipitate; then set the mixture aside to settle. The clear liquid is then poured off; to this a few drops of the potash or lime solution are added; if no brown-coloured precipitate ensues, it may be concluded all the silver has been precipitated in the form of oxide of silver. The latter is carefully washed in several changes of water, and then put aside to dry. When dry, it is placed in a bottle until a sufficient quantity has accumulated for reduction.

Silver in the Hyposulphite of Soda Bath.

The silver in the fixing-bath is not precipitated by either a soluble chloride or by an alkali. Use, therefore, a current of sulphuretted hydrogen gas, or pour into the bath a solution of a soluble sulphide, such as sulphide of potassium or sulphide of ammonium. Continue the gas or the addition of the sulphide as long as a black precipitate is formed; this precipitate is well washed in several changes of water on a filter, after which it is dried and preserved for reduction.

Silver in the Washings.—The washings may be thrown into a large tank containing either pieces of copper plates and copper clippings, or a solution of salt. In the first case, the silver will be reduced to the metallic condition in the state of a fine powder, which may be collected, washed, and dissolved in nitric acid; in the second case—that is, with a solution of salt—the silver will be precipitated as chloride, which at given intervals is collected and thoroughly washed on the filter. It is then added to the chloride of silver obtained from the other residues.

Silver in the Paper Clippings, &c.—Take a clean chafing-dish, or a small stove, from which all the ashes have been carefully brushed away. Make a small pile of the waste silvered paper and set it on fire; while the fire is burning, keep adding more and more of the paper, until the stock of paper becomes exhausted. See that every part of the paper has been thoroughly converted into ashes, and that the draft is not so strong as to carry them up the chimney. Collect all the ashes and preserve them likewise for reduction.

It is thus evident we obtain apparently four different sorts of silver powder. Let us examine them:—

The first is Chloride of Silver.

The second is Oxide of Silver.

The third is Sulphide of Silver.

The fourth is Oxide of Silver, together with the mineral impurities in the paper itself, such as lime, &c.

The latter may be reduced to a pure state, either as chloride or oxide, by first dissolving it by nitric acid, and then decomposing the impure nitrate of silver either by a solution of common salt, and thus obtaining the silver as chloride; or, secondly, by a solution of caustic potash, lime, &c., which precipitates the silver as oxide. In either case, the precipitate is carefully washed, as before described, and then mixed either with the pure chloride or oxide as the case may be.

The next operation is to reduce these deposits either into *pure silver* or directly into *nitrate of silver*. There are various ways of doing this work.

Reduction of the Chloride and Sulphide into Pure Silver.

Put these ingredients all together, and add to them twice their weight of dry saltpetre; mix them intimately. Into a crucible raised to and maintained at a red heat, throw in a spoonful of the mixed powder at a time; after each combustion, keep adding spoonful by spoonful of the powder until the whole mass has thus been ignited, and, so to say, burned. The nitrate of potash (saltpetre) is easily decomposed by heat, and gives up its oxygen to the silver in the chloride and sulphide; but the oxide of silver is reduced to pure silver very easily by heat alone. The crucible finally is allowed to cool, and then it is filled with water, which dissolves the soluble salt, the chloride, and sulphide of potassium, and perhaps a small portion of sulphate of potassa. The insoluble part of the fused mass will consist of pure silver in a sponge-like form, or in fine, isolated, minute grains. These may be collected and either fused into a solid mass, or dissolved in pure nitric acid, so as to form nitrate of the oxide of silver.

The reduction of the oxide of silver requires no addition of saltpetre; heat alone will be sufficient.

It may happen, and that frequently, that the operator has got neither a crucible nor a furnace to heat it conveniently. In this case, mix the chloride, sulphide, and oxide of silver, and weigh the mixture; weigh out an equal amount of fine, dry sawdust, twice the amount of saltpetre, and twice the weight of sulphur; mix all these ingredients intimately together. Of course these articles must be all perfectly dry. This mixture is a sort of slow gunpowder; slow, because the sawdust is not yet charcoal. Now take a piece of dry wood a couple of inches thick and a foot square. Place a spoonful of the mixture on the middle, and ignite it; keep adding more as the combustion proceeds, until all of the mixed powder has been deflagrated. By this proceeding the silver compounds are reduced into a spongy mass of pure silver, which may be separated from all extraneous matters by washing in water, and then dissolved in nitric acid. The sulphur may be omitted if a red-hot plate of iron, or an iron ladle, be substituted for the block of dry wood. But in this case the iron plate must be maintained at a red-heat all the while—that is, until the mixed powder no longer burns, but settles down into a fused mass, which contains the silver in a minute granular or spongy form.

Another Mode of Treating the Silver Compounds.

Collect all the oxide and chloride of silver as obtained from the various residues, and dissolve them in ammonia; afterward pass a current of sulphurous acid through the solution as long as a precipitate is formed. This precipitate is metallic silver in a state of fine division. After a thorough washing on the filter, it may be dissolved in nitric acid for use.

Sulphurous acid for this experiment may be easily prepared by decomposing sulphuric acid, by means of small chips of dry beachwood placed in a retort, or flask, furnished with a glass tube, bent at right angles, and dipping into the silver solution. Heat being applied to the vessel, sulphurous acid is disengaged.

Instead of using sulphurous acid for this purpose, sulphite of ammonia may be mixed with the dissolved silver; the result will be the same.

STEREOGRAPHS OF SCENES IN YORKSHIRE. By G. Wallis, Whitby.

Mr. Wallis sends us some stereographs of Whitby Abbey, Mulgrave Castle, and scenes about Whitby, which are exceedingly perfect. They are soft, delicate, and brilliant as photographs, and many of them possess much pictorial merit, far surpassing the common average of local views. Mr. Wallis does not state whether these are published or not; but we should think a perfect series of everything worth taking in the district, as perfectly done as these, ought to find favour with the public.

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WILLIS'S ANILINE PRINTING PROCESS.

The process of printing by means of a bichromate and a salt of aniline, patented at the latter end of 1864 by Mr. Willis, and described in our last volume, is now, we understand, in commercial operation, the patent rights having been purchased by Mr. Vincent Brooks, the well-known lithographer. The last number of the *Practical Mechanic's Journal* has some remarks on the subject, and also some extracts from the circular and price-list issued by Mr. Brooks. The editor of the Journal in question speaks in very high terms of the process, as superseding manual or mechanical modes of copying plans of all kinds. He also mentions that Mr. Brooks is engaged at the present time in experimental investigations with a view to applying the process to photo-lithography, an aim which he regards as beset with difficulties, but which, if accomplished, will be, he considers, one of the greatest advances ever made in this department of art. We shall look with interest for every advance in photo-lithography; but we cannot help thinking that the comments to which we refer are made in ignorance of what has already been done in this direction. By more than one process of photo-lithography, and by Mr. Osborne's process notably, hand-drawings can already be copied with perfect accuracy. Indeed, to quote the words of the writer in question: "The most elaborate and complicated hand-drawn designs, or the most bewildering reticulation of geometrical-drawn detail, can be brought without any loss of a line or dot, or of the 'feeling' of the original artist, into a state to be endlessly reproduced by common or other lithography." All this, which the writer regards as prospective, is already done. If it can be done better or cheaper, so much the better; but the fact that it has already been done should not be ignored. The following extracts are from the Journal in question:—

Drawings or Tracings copied by Willis's Patent Aniline Process of Photographic Printing.—This invention produces *fac simile* copies of drawings or tracings, of the same size as the originals, however large their dimensions. The most delicate shades, as well as the black outlines, are faithfully reproduced, and are quite permanent. The copies are obtained by the superposition of the drawing or tracing on prepared paper, and exposure of both to light; the dimensions of such copies are, therefore, precisely those of the original drawing. The tracing is not injured in the slightest degree by the process.

When a comparatively small number of copies is required, this system will be found very economical, no cost being incurred for drawing, engraving, or lithographing. It is also the most expeditious, as copies of the largest and most elaborate drawings can be supplied in a few hours.

Directions.—When tracings are prepared expressly for being copied, the following directions should be attended to in order to insure the best results:—

The tracing-paper should be thin, clear, and colourless. The outlines should be drawn boldly, and with very black *Indian* ink; the shading with washes of Indian ink, of a slightly deeper tint than would be ordinarily employed; so that the tracing, when laid on a sheet of white paper, may appear rather darker than desirable. Colours should not be introduced, because reds and yellows are represented too dark, and blue too pale. Coloured drawings, nevertheless, frequently yield good copies.

From the preference in the use of the word *tracings* to *drawings*, it may be inferred—and the fact is so—that the former are preferred from their greater translucency. But drawings, unless made on very opaque paper, *can* be thus copied also, and we saw at Mr. Brooks' office some designs in sepia or Indian ink, delicately shaded by the artist, for certain elaborately carved *consoles*, which had been made on drawing-paper as stout as ordinary "double elephant," and which designs were nevertheless beautifully brought out. It takes much more time of exposure to our feeble English day or sun light, however, to bring such drawings on paper out in copy, and as time is here, as elsewhere, one element of cost, of course the worker of the patent prefers tracings, and so should his customers, wherever practicable.

The following is the published scale of prices for reproduction:—

Size of Copies.		Price of a Single Copy.		Price of 12 Copies.		
		s.	d.	£	s.	d.
11 inches by	8	1	0	0	9	0
13 ,,	10					
15 ,,	11	1	6	0	12	0
22 ,,	15	2	0	0	16	0
22½ ,,	17¾	2	6	1	1	0
26 ,,	20	4	0	1	15	0
30 ,,	22	5	0	2	2	0
35 ,,	24	7	6	3	3	0
40 ,,	27	10	6	4	4	0
53 ,,	31	15	0	6	6	0

Referring to the list of prices—which we quote as interesting to photographic printers—it appears to us that in many instances they scarcely compete successfully with ordinary silver printing, the chief economy consisting in the fact that no negative is required.

THE COLLODIO-ALBUMEN PROCESS.

BY THE HON. NASSAU JOSCELYN.

Sometimes it happens that one person becomes possessed of an idea or two which have not crossed the minds of others. Should this be the case in the present instance, perhaps you would kindly insert this note in your next number; if not, pray deal with it as you will.

I have worked the collodio albumen process pretty steadily of late, with, of course, *unvarying* success, as every one must who seriously takes it up; the *only* drawback being blistering of the film. I see Mr. Mudd recommends a preliminary coating of dilute albumen; I have no doubt this will prevent it. I have always coated first with india-rubber solution, which sticks awfully tight, and cannot injure the first bath, and is quite free from specks, &c.; so that I never clean my plates beyond a rinse in nitric acid and another in clean water, followed by a drying on a towel and a rub with a bit of leather.

I never use glass funnels, not even for returning the bath through a filter into its bottle, as I always use a flat bath for both sensitizings.

I invariably make my funnels, as I want them, of a sheet of foolscap paper, folded into a "cocked hat," and the point of the hat cut off with scissors. This forms an excellent funnel, and will bear the weight of a large filter, and is, of course, always clean. When travelling, I never take either bath or funnel, but a quire of blue foolscap. The tray I make by folding up a sheet, and pinching it at the corners with four clips. It is sure to be *clean*, it economises silver solution (which is easily returned to the bottle by a paper funnel and releasing one of the clips over the edge of the table), and, when done with, it is crumpled up and thrown away. This involves *no cleaning out of dishes* or of funnels, and is a great convenience.

My photographic kit is generally composed of a leather case, taking a 7½-in. by 5-in. camera, with Dallmeyer's new lens, and a pair of stereos (rapid), and three double holders, the legs folding up, and going into a short oil-skin cover; a small hand-bag, containing the aceto-nitrate bath (about ten ounces) in a bottle in wooden case; a quire of foolscap paper; a silver hook to fish the plates from the bath, and a nest of developing glasses in a wooden case, with paper between each; two dozen small filters, and half a dozen large ones; a bottle of dry pyro, and two other two ounce bottles, one full of citric acid, twenty-four grains to the ounce, and the other of nitrate of silver solution, thirty grains to the ounce. These three fit into three pockets in the side of the bag. This is all; and when we add the precious plate-box, holding forty-eight non-sensitized plates, and never —as Mr. Mudd says—to be let out of our own hands, the whole kit is but very small; and by sensitising the plates as they are wanted, their quality can be depended upon as being first-rate. I sometimes make a mistake in the exposure, which may influence the excellence of my negative, but failure from bad preparation is quite unknown to me.

PS.—As the albumen plate must be popped into the bath *at once*, I generally stand it up on end, and, by means of the hook, lower it, *face down*, upon the solution without stopping; then take it by two corners and lay it flat upon its back in the solution. The hook should be flattened and made very sharp in order to get well under the plate.

Sometimes, in emptying my bath, I let one corner go over the edge of the table, and holding the bottle underneath, prick a hole through the paper with the dipping-hook, when it empties into the bottle at once without a funnel. The paper I use is similar to the sheet on which this note is written.

British Legation, Florence, 5th July, 1866.

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ALEXANDER DUMAS ON PHOTOGRAPHY.

About two years ago, in an eloquent address delivered at a meeting of the Society for the Encouragement of Industry, Alexander Dumas, père, recalled his personal recollections of Daguerre, to whose memory he paid a noble tribute, expressing at the same time the highest appreciation of photography as the source of "new and unexpected pleasures experienced in collecting the cherished resemblance, which seems like an emanation, even, of the person loved, admired, or mourned." We were not a little amused, therefore, recently, in reading in the feuilleton of *Les Nouvelles*, a French daily paper, some stringent serio-comic denunciations of the art and the tribulations it had introduced. The chapter on photography to which we refer, incidentally occurs in an account of certain rambles "Across Hungary," and as some of the observations are suggestive as well as amusing, we make some extracts for the benefit of our readers:—

> I have, in leaving Vienna, forgotten to describe a curious enough fact. At Vienna photography is generally practised by women.
>
> I may here mention, again, the horror I have already expressed elsewhere, *à propos* of a portrait of myself, which one of the journals has published; I may also add, that I have a horror of photography, and that this horror extends itself to all photographers. Now, as I am accustomed not to avow love or hatred, except with sentiments founded on reason, here are the reasons for my dislike to photographs and for photographers.
>
> Let us commence with photography.
>
> When—in 1837, if I remember rightly—my friend Daguerre came to show me the first examples of his Daguerreotype, which faithfully represented a street in Paris, with a cage and canary bird in the foreground, and he made an observation that the inside of the cage had not come out correctly, seeing that the bird—not knowing the honour paid him by the science—had moved. I naturally commenced to laugh, that the sun, which had been 6,000 years according to the Bible, 12,000 years according to the zodiac of Denderah, and 36,000 years according to the Chinese, had been engaged in ripening the crops in the field, the peaches upon the stairs, and love in the heart, was now to be forced out of its millenniary idleness to reproduce the different aspects of the world it illuminates. After this first access of hilarity had passed, I applauded the ingenious invention, which I believed only at first applicable to inanimate objects more or less immobile, without suspecting the disastrous consequences of it, and that, violated like Lucrece, by MM. Niepce and Talbot, this honourable matron would deliver, in dying, this fierce, shameless thing called photography, which would itself undertake to reproduce, not only landscapes, monuments, ruins—reproductions for which it had a particular aptitude—but also living persons, men, ugly enough naturally, and whom it does not embellish; women, the consolation of the eye when she is not that of the heart, whom it disfigures; I was not only altogether in error myself, but, by applauding it, I propagated this deplorable error.
>
> In fact, what are the results of photography? I have already mentioned the merit, that of disfiguring the human race, already ugly enough as it is. Then, of producing a class of false artists, composed in general of those who had not the ability to become painters; they make themselves photographers, calling themselves, some the pupils of Ingres, and others the pupils of Delaroche, as if to be a photographer they needed to be the pupil of one of these; false artists, incapable painters, who with some exceptions, if photography did not exist, could not have been photographers, and would have been trained up to some trade useful to society, instead of the disastrous occupation to which they have abandoned themselves; an occupation that has no other results than that of vulgarising art without extending it.
>
> Formerly, when people gave their portraits, they could not give them profusely; they were so valuable that they gave them only to those persons whom they dearly loved. A portrait in oil by Ingres or Horace Vernet cost three thousand francs; a miniature by Isabey, or by Mme. de Mirbel, cost a thousand francs. In receiving a portrait of a friend or lover, they received a gift doubly precious, the present combining in one the image of the beloved person and a valuable work of art.
>
> Now all that is passed. One gives portraits to those who ask for them as we would alms to a mendicant; and if the portrait is not given to a person to whom we are altogether indifferent, it is made a matter of exchange, and we give one portrait with a stipulation that we receive another. No one ventures to refuse a thing that costs ten sous, and when, if it is refused, it

will be bought for twenty from any of the sellers of novelties. All kinds of people, who are the most indifferent to you, include you in their collections; you and your *confrères*, those of the art which you practise, and the science which you profess. You are arranged like a collection of butterflies or moths; only there is the difference that the beautiful butterflies of the Tropics, or specimens of rare and sacred beetles, may cost a hundred francs each, while the greatest contemporaneous men joined in collection are invariably sold at ten sous a piece. It is humiliating.

So much for photography. Let us pass to the photographers. Though you may enjoy little celebrity, your arrival is welcomed —whether you travel in France or abroad—by a deputation of photographers. Informed beforehand by the journals, they come to ask you to sit for your portrait. You have to employ in vain, when you are face to face with them, those ruses that your imagination suggests to you. You change, like Proteus, to lion, serpent, water, or fire. You plead in vain: "But I am old and I am ugly:" that is always disagreeable to say, even to a photographer. You have vainly to add: "Photography makes me uglier still;" and that is disagreeable for them to hear. Nothing does, however. You object because of the little time you have. You are answered, "Monsieur, it is a thing of a moment." You cry out, "Yes, I know your moments; it is not the first time I have sat." "Monsieur," resolutely says the photographer, "do not confound me with my confrères; I have invented a completely new process; you will only have to seat yourself, and before you have winked your eye—*crac!* —your portrait will be done." You soon understand all resistance is useless. You make your conditions; they are granted you in advance. You have to move when you like, you will rise when you like, and you will leave when you like; and you are finally informed of the floor. "On the third floor, Monsieur, and a very easy staircase." "Go on, it is not too high," you will murmur; you decide; and, like M. de Montmorency, who, condemned to be executed at five o'clock in the evening, demanded it to be three, so as to die at the same hour as Our Lord Jesus Christ, you demand to be executed at once, and you follow the photographer. You mount to the third floor. This is the first deception that awaits you. "Monsieur," says the photographer to you, pointing out to you a winding staircase, "will you ascend, if you please, this staircase?" "Ah, ah! you told me that I only had to ascend to the third floor." "The saloon is, in fact, on the third floor," says the photographer, smiling a charming smile, "but the atelier is on the fifth; you comprehend, it is to have the best light." You look dolorously at the two tiers, and determine to travel over it all. "At last!" you murmur; and you mount the two other steps. The platform is ready, the chair is on it; it is exactly the same preparation as that for the garrot. Nothing is wanting, not even the *tige de fer*. You are directed to the chair, and you sit down with a sigh.

"How do you wish me to place myself?" you ask.

"Just as you will; take a familiar pose Photography is, you know, the reproduction of nature."

You take your habitual position. The photographer directs his apparatus towards you."

"Pardon, Monsieur," says the photographer; "will you do me the favour of drawing in your right foot, and placing on the same level your left foot?"

The very pose of Thomas Diafoirus in the *Malade Imaginaire*. "It will not be graceful," you venture to say.

"It would be still less graceful, I suppose," says the photographer, who is becoming excited, "to have the right foot enormous, and the left imperceptible! They will believe you to be lame, like Byron; and one can be a poet without being club-footed!"

You bow to the compliment, and you draw in your foot, and, by a natural movement, you let your left hand glide down upon your knee.

"Pardon, pardon, Monsieur!" cries the photographer; it is your left hand now that will become enormous, and your right hand will not be more in proportion. Nature, Monsieur, nature!"

That both your hands may be in proportion, you draw back to you your left hand, and place your right hand in your pocket.

"I warn you, Monsieur," raising himself, after having looked at you through his apparatus, says the scholar of M. Ingres or M. Delaroche, "I warn you that in photography there is nothing so ugly as a hand in the pocket. You have a maimed air; and you do not wish that anyone should think that the man who writes such beautiful things is one-handed."

You draw your hand from your pocket, and you pass your thumb into the slope of your waiscoat. "Is it better thus?"

"It is not bad, although the position is a little forced; but it is no matter; that will do, that will do; only do not stir."

"You told me that I would be able to move."

"As much as you wish when you are not in a position as you are now."

"And my head—what shall I do with it?"

"Whatever you wish, only place it naturally."

You let your head fall a little more to the left, then the right.

"Ah!" says the photographer, "this would be good for Alexander the Great; and though you have good right to that title, perhaps the world would see a certain affectation on your part, if you awarded it to yourself,"

"But, finally, Monsieur, how do you wish me to hold my head?"

"Straight, parbleu!"

You arrange your head.

"There, that is good, but you could not hold it like that; I will put you the head-rest." And the photographer places round the occiput a circle of iron.

"There, voila!" he says, satisfied at last that the position is natural. "Well, be it so. Nature, Monsieur, nature!"

"And my eyes—what shall I do with them?"

"What you like." And you accordingly look down.

"Oh no, no!" says the photographer; "it is absolutely necessary that you look at some object."

"The ceiling?"

"No, too high."

"The carpet?"

"No, too low."

"But, finally, what ought I to look at?"

The photographer places himself before his apparatus, takes the pose of a gunner who is going to put the match to a piece of cannon, and seriously says, "Look at my shoulder."

You look at the shoulder of the photographer.

"Now smile."

"At your shoulder?"

"Yes."

You smile. At the end of a minute, during which your arteries have counted the seconds, the photographer closes his lenses and carries away his negative. At the end of ten minutes he opens the door and tranquilly says to you, "You have moved; it has not come out well. We must begin again."

At Vienna, as I have told you, they are nearly all women who take photographs. On the material side of the operation there are the same inconveniences; but, at least, the ideal side offers compensation. Firstly, the women who take the photographs are naturally pretty; and at Vienna, where, as I have already said, all the women nearly are pretty, the lady photographers ought to be beautiful. They are so. Now see the difference. Firstly, if you are invited by a pretty woman, you are not told on what floor she lives; you know beforehand that the angels, represented here by women, adhere instinctively the nearest possible to the sky. You mount, then, without complaint, three, four, and even five storeys. You pant; it is with emotion. You kiss the hand that is extended to you; that is your recompense. If you do not talk German, you talk the universal language—the language of signs. This has the double advantage of being the most expressive, and of making in five minutes the same way as the others in an hour. Then, as your charming photographeress cannot explain by word what she wishes, she takes your hands, and places them where she wishes them to be; she takes your head, and places it where she wishes it to be turned. Now, I do not know that there is anything disagreeable in feeling your head placed in position by two pretty hands. Then a time before, instead of saying, like the photographer, "Look at my shoulder!" she says, "Look at me!" and she does not need to add, "You will smile;" the smile comes upon the lip by itself when one looks at a pretty woman.

As for me, behold my history. On arriving at Vienna, I learnt that I was waited on by a charming photographer, whose name I will mention, to recommend her to all my friends, and to all those to whom my affirmation would become a recommendation—Madame Wilhelmine Stockmann. "Where does she live?" asked I. "Fifth floor, Kohlmark No. 1." And behold, I, who could not bear photography, make my first visit to thank a photographer for having asked of me the favour of taking my portrait. Madame Stockmann is not a Viennese, she is a Hungarian. When the Hungarians are pretty, they are very pretty. I posed three, four, five times, as often as my photographer wished, and she made of me three excellent photographs, which, instead of having a sulky expression, reproduced my best smile. At the moment of my leaving the atelier, my pretty photographer, in reproaching me for not being a little more serious, had asked me to write my name in her album. Not only did I write my name, but underneath my name these four lines:—

> "Si je ne suis point sérieux,
> Ce n'est point à vous d'en médire ;
> La faute en est à vos beaux yeux,
> A qui mon cœur tient à sourire."

The lines are not good, but they would have been worse if I had failed to make a photograph.

Now let us approach the serious question. The plague of modern society is, that there is not enough employment for women. For the most part, the careers of art and industry open to men, they are closed to women. Why, then, in Paris, should not the women imitate the example that is given them in Vienna? Why should not the women make photographers? Then, if they would permit me to venture an idea that comes to me whenever I enter the grand "Magasins," like "La grande ville de Paris," "La trois Quartiers," like "Le grand Saint Louis," I have constantly seen there the women at the counting-house, and the men doing the work of the counter in unfolding and displaying the fabrics. Would it not be more logical that this work was made for women? The women would know more of fabrics, and make much of the value of the qualities of the merchandise. If this system were employed, ten thousand young girls, who are to-day between misery and prostitution, would gain to-morrow three francs per day. The charge of the counting-house is the work of men; displaying, measuring, and cutting the stuffs is the work of women. It is true that the tradesmen to whom I have spoken of this change, all, in approving the social morality, disapprove the prospect of the custom. They pretend that they make it necessary to make the women served by men, and men by women; and perhaps, in fact, they are right. The more motive for the women to be made photographers.

ON CERTAIN SCIENTIFIC APPLICATIONS OF PHOTOGRAPHY AND STEREOGRAPHY.

BY PROFESSOR MACH OF GRATZ.*

In making experiments on the effect upon the retina of masses of light distributed over certain spaces, the results of which are valuable to physiological optics, and in the construction of explanatory geometrical figures, I felt the necessity of procuring unalterable surfaces, the intensity of the light from different portions of which should vary according to a law selected at pleasure. I attained this object by photgraphing, during rotation, discs, and cylinders, having painted upon them black and white sectors of various forms, after I had satisfied myself, by photometric determination, that such revolving bodies act on photographic paper, according to the same law as Plateau has given for their action on the retina.

The photographic effect on any part of the prepared plate depends, according to this law, only on the time and intensity of illumination, and is nearly proportioned to both. It might thus be concluded, *à priori*, that several images which fall in succession on the same plate, so long as no point is over-acted on, would simply add themselves to each other, and, like elements of motion, be super-imposed on one another. Experiment shows this to be the case. The eye had the power in certain instances, which it is not necessary more particularly to point out here, of perceiving these images separately. The observations which have been now brought forward constitute the scientific basis of the process which is employed for the photographic representation of the so-called "Ghost appearances."

I hit upon another use, which, though it is very obvious I must look upon as new, since I have not been able to learn anything regarding it, either in published documents or by means of inquiries made among those acquainted with the subject. I photograph a body—for example, a die—stereoscopically, and, during the operation, put another body, such as a tetrahedron, in the place of the die; I then see, in the stereoscopic picture, both bodies, transparent, and penetrating each other.

The aid which such stereoscopic representations afford to the study of stereometry, also of descriptive geometry, and that of Steiner, is at once apparent.

The experiments which I have made hitherto have turned out altogether so pleasing and so elegant, that it is reasonable to hope that the method may be applicable to the representation of anatomical preparations. Let us take, for instance, the temporal bone, and, while photographing it, put a cast of the cavity of the organ of hearing in the proper place. We shall then see in the stereoscopic picture the temporal bone transparent, and within it the cavity of the organ of hearing. Such a picture would, in many respects, be more effective than even an anatomical preparation.

I have in view several improvements in this process, which I can recommend as worthy of special attention by practical men.

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[*] From the Proceedings of the Vienna Academy of Sciences, 1865, No. 26, p. 185.

DR. CURTIS'S PROCESS OF PHOTO-MICROGRAPHY.

BY R. L. MADDOX, M.D.

Referring to the beautiful specimens of photo-micrography which have excited much interest at various photographic meetings, Dr. Maddox writes to the *Intellectual Observer* as follows:—

Through the kindness of Dr. J. J. Woodward, who has charge of the Medical and Microscopical Department in the Army Medical Museum, U. S., I am enabled to offer for the pages of your valuable journal a brief description of the plan adopted in taking the photo-micrographs alluded to, and published in your July number, and which becomes of more interest, as Dr. Woodward shows by a further number of prints of various objects, taken both by sun and artificial light, the excellency of the method.

The difference in sharpness given to the 1-50th over the 1-8th, and achromatic concave amplifier, is attributed by him to the chemical process employed in rendering the albumen negative intense. The smaller prints were from the original negatives, and in the enlargement from these the solar camera was not employed.

The diatom *Pleurosigma angulatum* was simply a dry mounted specimen, adhering to the cover of an ordinary slide, which was removed, turned, and then covered by the thin glass necessary for the 1-50th. The part alluded to as possibly a sun spot was only due to a particle of adherent dust.

The following plan is adopted by Dr. Curtis at the laboratory of the Museum, the lenses of the objectives in use being corrected for the violet ray, and the formula furnished by Mr. Lewis Rutherford, so well known for his astronomical photography; but in the 1-50th, the difference between the visual and actinic foci is so small as not to be noticed in the correction:—

Outside the window is placed a Silbermann's Heliostat, which reflects the rays from a plane mirror, duly centred through a brass tube, at the orifice of which hangs a large cell, with parallel sides of plate glass, filled with a saturated solution of the ammonio-sulphate of copper, the other arrangements of the apparatus being properly disposed in a dark-room, instead of using a camera: thus practically violet monochromatic light is employed; the sensitized albumenized plates being, in this case, placed about three feet from the object for the 1-50th, rather less for the 1-8th and amplifier, and seven minutes' exposure allowed. The condenser used was a pair of plano-convex lenses of about one inch combined focal length, a large central stop being placed over the flat surface of the one nearest the object, thus illuminating it with only the oblique pencils. These lenses were not achromatic, as monochromatic light was employed. The value of these details will, I trust prove a sufficient apology for again trespassing on your space.

EXPERIMENTS AND OBSERVATIONS ON OXYGEN AND BINOXIDE OF HYDROGEN.

Barium and manganese, which chemists agree in classing among the bodies improperly called *diatomic*, and which the author proposes to call *diplotypic*, present remarkable differences in their binoxides. Binoxide of manganese, for example, when treated with hydrochloric acid, gives chlorine, while binoxide of barium under the same circumstances gives binoxide of hydrogen.

Binoxide of hydrogen remains intact in the presence of binoxide of barium which served to produce it; but in the presence of binoxide of manganese it decomposes into oxygen and water, the binoxide of manganese undergoing no change.

The oxygen which peroxidizes the manganese decomposing the hydrochloric acid to take the place of the chlorine and form water, it is clear that the oxygen of the binoxide barium cannot do the same, at all events under ordinary circumstances. No chemist who has prepared binoxide of hydrogen by Thenard's process has obtained chlorine. It must be admitted, then, that chlorine has more affinity for hydrogen than for the oxygen which peroxidizes the barium, while the contrary is the case with the oxygen which peroxidizes the manganese. This is demonstrated by the following experiments:—

If we fill with chlorine gas a bottle into which a little water and some very finely-powdered binoxide of barium has been introduced, a lively effervescence is seen when the mixture is shaken, the colour of the chlorine dissappears, and in the end the bottle is found to be full of oxygen, which does not act on ozone paper.

The following experiments show still further differences between the binoxide of barium and that of manganese. We know that sulphovinic acid gives aldehyde when heated with binoxide of manganese. In the presence of binoxide of barium, however, sulphovinic acid gives ether and bicarburetted hydrogen mixed with oxygen and sulphurous acid, the reaction commencing at 103° and ending at 150°.

Pushing the analogies still further, the author has succeeded in preparing oxygenated water by means of peroxide of manganese. This water is destroyed by the simple presence of binoxide of barium, just as that obtained by the latter body is destroyed by binoxide of manganese, an experiment which clearly demonstrates the difference that exists between these two products. But the difference is rendered still more evident by the following fact: the oxygenated water obtained by means of binoxide of barium and that obtained by means of binoxide of manganese destroy each other; the effervescence produced when they are mixed is not violent, but it is continuous, certain, and indubitable.

After referring to the physical investigations which the author intends to make, he states that oxygenated water prepared by means of binoxide of barium, when submitted to the action of four large Bunsen's elements, gives equal volumes of hydrogen and oxygen, even when far from being saturated, showing that the binoxide of hydrogen is decomposed in preference to the water.

Lastly, the author remarks, that if oxygen presents two allotrophic states, it is eminently probable that the bodies with which it unites may do the same; and hydrogen giving birth to two distinct binoxides, it is probable that it also may present itself in two distinct states, complementary one to the other, in the two binoxides. Further, it seems probable that barium may present itself in one of these states, and manganese in the other, which will account for the differences observed in their binoxides, and that the two bodies may be found in the opposite state to that in which we know them, and, indeed, that at elements may exhibit this sort of allotrophy.—*Scientific American.*

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NEW PRINTING PROCESS WITH URANO-PLATINUM COLLODION.

BY J. WOTHLY.*

Preparation of the Paper.—Starch is made by boiling six drachms of arrowroot in a pint of distilled water. With this starch cover ordinary plain photographic paper by means of a sponge. Such a coating renders the paper more sensitive to light for the urano-platinum process. A slight addition of some animal ingredient—as, for instance, isinglass—does not diminish this sensitiveness, as long as it does not exceed a certain limit; an addition of citric or tartaric acid (a few drops of a concentrated aqueous solution) hastens the actions of light.

Sensitizing Liquid.—From one to three ounces of nitrate of the oxide of uranium are dissolved in six ounces of alcohol, to which afterwards thirty grains of chloride of platinum in solution are added. Basic salts of uranum cannot be employed, because they produce a turbidity in the collodion when their salts are mixed with it.

Preparation of the Collodion.—A few drops of the oil of turpentine are added to plain collodion, and then an ounce of the sensitizing solution is added to every three or three-and-a-half ounces of this collodion. The sensitiveness of this collodion is increased by the addition of two or three drops of a strong solution of chloride of palladium, or of the nitrate of the oxide of palladium to eight ounces of collodion.

The paper, as above prepared, is flowed with this collodion, and when dry it is exposed beneath an exceedingly thin negative. An exposure of about the same length as that required for the ordinary silver picture produces a feeble, bluish-black print, which, after washing, is intensified in a bath containing ten grains of chloride of gold in four pints of distilled water. It is afterwards fixed with sulpho-cyanide of ammonium, which then communicates to it a distinct blue-black tone. Plain paper very frequently contains a small quantity of lime, and the print prepared by this process then assumes a slight yellow tinge, by reason of its containing a small portion of the insoluble uranate of lime. In order to prevent the print from turning yellow, it is well to give it a final wash in a very dilute solution of acetic acid.

If the prints, after exposure, and before they have been washed, are immersed in the gold bath, rose-red tones arise in the light, but the clearest whites remain white; this gives the pictures a very peculiar appearance, as if the rose-red tinges had been laid on with water colours.

The positive prints obtained by this process are more permanent than silver prints against the effects of chemical reagents; thus they are proof against concentrated nitric acid.

◆

ON THE ESTIMATION OF SILVER OXIDE AS METALLIC SILVER.

BY DR. ALEXANDER CLASSEN.

Silver oxide is easily reduced to the metallic state by means of cadmium. A solution of nitrate of silver is evaporated with sulphuric acid until all the nitric acid is driven off. The sulphate of silver is then dissolved in hot water, and a stick of cadmium is placed in the solution. The reduction of the silver oxide proceeds immediately. The metallic silver is easily separated from the cadmium, and collected in a mass, which can be washed by decantation with hot water without loss. A previously tarred porcelain crucible will serve to effect the reduction in. As the reduced silver may possibly have a little cadmium mixed with it, it is well to heat the acid liquor until no evolution of hydrogen takes place. In the clear liquid which remains not a trace of silver can be recognised. The reduced silver is now washed until the washings give no precipitate with chloride of barium, then dried, and lastly ignited, by which the greyish black of the precipitate is changed to silver white.

The author here quotes some weighings to show the accuracy of the results.

The reduction of silver compounds by means of cadmium, he states, goes on very quickly, and as cadmium is but slightly soluble in dilute acids, the same piece of metal will serve for several operations, without even losing the metallic lustre of the surface.

Freshly precipitated chloride of silver may be reduced in the same way.—*Chemical News.*

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* *Humphrey's Journal* (from Jacobson's Chem. Tech. Repertorium).

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 8th August, 1866.

It is now some time since that I made known to you, in this correspondence, a new method of heliographic engraving, which had been communicated to me by M. Mialaret, an enthusiastic experimentalist, who found, in the depths of Louisiana, and bereft of the usual channels of information, the means to advance the art to which he is a devotee. I have to-day received from that gentleman a further communication concerning his operations on dry collodion.

M. Mialaret thinks that the practical difficulties lie, above all, in the rapidity and in the regularity of developing the picture. According to what he says, a difficulty arises in the want of power of the liquids usually employed to penetrate the dry collodion, and in order to restore to the photographic coating the porosity and the gelatinous consistency which have been lost in the process of drying, he makes use of the following method with entire success.

After the exposure of the collodionized glass to the light, he takes it from the slide and pours upon the surface another coating of collodion rendered limpid by the addition of alcohol. The glass, thus treated, is afterwards plunged into the nitrate of silver bath for about five minutes, or until the disappearance of any trace of greasiness, and it is then developed in the ordinary manner.

The addition of alcohol to the collodion is absolutely necessary, otherwise the coating impressed by the light would be dissolved, and the picture destroyed.

The collodion used by M. Mialaret is the same as that forming the sensitive coating. He renders it limpid by the addition of alcohol until he is certain, by several trials, that it cannot dissolve the dry collodion, but soften it only. No doubt the normal collodion, strongly alcoholic, will serve the purpose, and is an experiment worth trial.

The last meeting of the Photographic Society previous to the vacation was held on Friday, the 3rd instant, when Mr. Maxwell Lyte presented a new varnish for negatives on glass which he uses; it is composed of gum rendered soluble by chloroform, and dissolved by benzine with the addition of amber. This varnish has the great advantage, above others, of being very solid.

M. Duboscq presented a model of the photographic apparatus of M. Auguste Chevallier. This panoramic instrument, as I described some months ago, is intended to draw plans by means of photography, and will furnish most accurate documents. It opens and closes mechanically after making an entire sweep of the horizon.

M. Marion also exhibited to the Society some specimens of a new photographic paper manufactured by him, and machine-made. This paper is collodionized as well as waxed. It is about nineteen inches wide and of an indefinite length. It is rendered sensitive by an acidulated bath, developed by gallic acid, and fixed with the hyposulphite. Nothing is changed in the employment of the different manipulations.

M. Poitevin sent a long account of his new observations on the chemical action of light upon iodide of silver. The author not being present at the sitting, I shall only be able to describe his work in my next communication.

Ernest Lacan.

SCHONBEIN'S METHOD OF PREPARING PEROXIDE OF HYDROGEN.

Dear Sir,—It may interest you to hear that I have been endeavouring to form a weak solution of peroxide of hydrogen by the method suggested by Schonbein.

I have not succeeded in forming any appreciable percentage of it. The amalgamated metal has been shaken with the water, I may say, for hours by myself and assistants in my laboratory. Immediately I heard of Schonbein's process, I determined to try for myself, believing that the use of peroxide of hydrogen for photographic purposes will only be of real utility when pure, the free acid found in commercial samples neutralizing, in my opinion, all the good an excess of oxygen is capable of effecting. Possibly, some others of your photographic friends have experimented on the same substance with Schonbein's formula. I may observe, that the only visible effect of the shaking was the formation of bubbles of gas (hydrogen); the reaction was, however, of so feeble a character as hardly to affect the zinc. There were faint traces of oxidized zinc, but the well-known white, dense appearance of the oxide of zinc was not apparent.

The mixture has been standing in my laboratory four weeks, and been well agitated every day:—

Mercury	6 parts
Zinc	3 „
Water	9 „

Possibly my proportions are at fault; if so, kindly inform me.—I am, dear Sir, yours faithfully,

Amateur and Subscriber.

[Have any of our readers any experience with this method? As we have little faith in the peroxide of hydrogen for the purpose proposed, we have not given much attention to its preparation.—Ed.]

◆

Talk in the Studio.

Photo-Relievo Printing in Printing Ink.—We have received from Mr. Woodbury some specimens of photo-relievo printing in fatty ink differing little in composition from ordinary printing ink, of sufficient excellence to justify the conviction that this method of printing may shortly, when necessary, take the place of the gelatinous ink hitherto used. For many purposes the gelatinous ink, made perfectly insoluble, will doubtless answer every purpose, but it is probable that for others the use of a fatty ink may be desirable, and the recent experiments leave no doubt of the successful accomplishment of such a mode of printing.

Gelatine and Clay Photographs.—An ingenious correspondent, Mr. Willing Firling, of Dorchester, sends to us examples of a new process, the details of which he promises to send us shortly. The pictures are like positives on glass, with pure dead white lights, and the material employed is, we are informed, porcelain clay, and a preparation of gelatine. Further details are not stated at present.

Photo-Lithography.—We have received from our esteemed confrère Herr Schrank, Editor of the *Photographische Correspondenz*, a very fine example of photo-lithography after nature, produced from one of his own negatives by Messrs. Riffenstein and Rosch, of Vienna. The delicacy of the gradation of half-tone leaves very little indeed to desire.

Cabinet Portraits.—A recent communication in our columns from Messrs. Window and Bridge suggested the importance of introducing a new style of portrait to supersede the *carte de visite*, which, as our translantic friends would phrase it, seems to be "played out." We have just received from Mr. Notman of Montreal, one of the ablest photographers in Canada, a similar suggestion, together with examples of the style he proposes. His specimens are a little less than those proposed by Mr. Window. As it is of the utmost importance to success, in introducing the new style, that perfect unanimity should prevail amongst photographers at the outset, we shall have something more to say on the subject in our next. In the meantime we may remark, that a variety of strong reasons exist for adhering to Mr. Window's suggestion. We shall forward to Mr. Notman, and also to some of our American confrères, examples of the new size and style, and shall be glad to obtain their co-operation in making a change which cannot fail to give a new impulse to professional portraiture.

New Mode of Fixing Prints.—A paragraph has recently been going the round of the scientific journals, to the effect that if the toned prints be placed in a five per cent. solution of common salt, which is then to be raised to the boiling point, and left ten minutes, they will be perfectly fixed, and merely require washing. What advantage is to be gained by this troublesome process is not stated. It is certain that a very careful washing would be necessary, for traces of a chloride left in the print would gradually tend to destroy it.

Colour of Light.—Dr. Memorsky and Professor Brucke, in a paper communicated to the Vienna Academy, describe diffused daylight as decidedly reddish, just as gas and lamplight is yellow. The only perfectly white light, they say, is the electric light from carbon points. The light of burning magnesium and the combustion of phosphorus in oxygen, they add, is violet.

Plastic Sulphur.—If liquid sulphur is mixed with very small quantities of foreign bodies, a compound resembling caoutchouc, and capable of resisting most chemical agents, is obtained. The smallest amount of iodine or bromine renders sulphur pliable, and very little tar produces the same effect. If caoutchouc is dissolved in sulphuret of carbon saturated with sulphur, a viscous matter, which is not attackable by concentrated sulphuric acid, is formed, and it may be spread over wood, &c., with a brush.

Patents and Prosperity.—The *Scientific Review* says: "The commercial prosperity of any country is in nearly all cases proportionate to the number of patents granted in it; those countries (England, France, and America) in which the largest number of patents are granted being the most prosperous in regard to commerce and manufactures, and those countries (China, Turkey, Switzerland, and Japan) in which no patents are granted being the least prosperous of any in the same respect.

Purification of Water.—It is stated that there is good reason to believe, from certain experiments recently made, that any kind of water may be freed, not only from the impurities it contains in suspension, but also those it holds in solution, and may thus be made fit for drinking, by adding to it a very small amount of a solution of permanganate of potash, and then filtering it through a layer of magnetic oxide of iron and carbon, a few inches thick. The required mixture may be obtained by heating in a close vessel red oligist ore and a small quantity of sawdust.

The Bill Proposed by the Inventors' Institute for the Reform of the Patent Laws.—The main objects sought to be accomplished by the Bill are as follows:—

1. A reduction of the cost of obtaining invention-right to a sum which shall not exceed what is absolutely necessary to defray office expenses, the payment of the same to be distributed over the period of the invention-right.

2. A preliminary investigation as to novelty, prior to the granting of the invention-right.

3. An extension of the term of all invention-rights and existing patents to twenty-one years, instead of fourteen.

4. After suitable delay and notice, securing to proprietors of invention-rights an indefeasible title.

5. A special tribunal for dealing with questions of invention-right.

To Correspondents.

J. A. A. M.—A variety of materials are employed for covering dark tents. The most perfect is a thin Macintosh cloth, which is quite light-proof as well. Sometimes a thickness of stout black "twill" and another of yellow glazed calico are employed.

T. S.—The addition of an extra quantity of an iodide to collodion already sufficiently iodized, which the collodion you purchased doubtless was, would produce the streaky marks you describe. That the addition of chloride of gold to the collodion should have removed this defect is to us new. The addition of a chloride to collodion has, in our hands, given more brilliancy and contrast, but it has not increased sensitiveness. In adding a chloride, one should be employed which would supply a base for the nitric acid liberated by the decomposition which ensues in the bath on the immersion of the plate. On immersing a plate coated with a collodion containing chloride of gold, chloride of silver will be formed in the film, and metallic gold will probably be precipitated.

L. Schaank.—Thanks for the photo-lithograph, which is duly to hand. We will write shortly.

Siccus.—Very much must depend on circumstances as to the best mode of constructing a portable dark-room with sufficient ventilation and convenience to permit of its use for the preparation of dry plates. The larger you can make it the better, both for convenience and ventilation. To aid in securing the latter, we should recommend that the top be double, with a few inches between the two pieces forming it, with apertures all round. If, then, the inner top be freely perforated with large holes, air can readily escape into the chamber between the two tops, and pass out at the apertures in such chamber. A similar arrangement might be made in the lower part of one of the sides, by which air could pass in. The preservation of the plates from light, whilst passing in and out, is easily accomplished by having an inner box or cupboard in which the plates could be placed to drain, dry, &c., as each one is prepared.

M. Cage. In order to effect your purpose, you must colour the photograph first, and make it transparent afterwards. The best method of obtaining transparency is by means of white wax, without any turpentine or any other solvent. Melt it in a jar, and apply it with a hog-hair tool to the picture, which should be laid upon a hot place, face down, and the wax rubbed in at the back until it saturates the paper. It will then dry transparent. The coloured photograph should then be backed with a piece of white or cream-coloured paper, which only need be placed in contact, without any mode of making it adhere. About a dozen modifications of the various modes of making a print transparent, and colouring it, have been patented; but none of them have been very successful. The great difficulty is, that all the substances used to make the print transparent gradually turn yellow. 2. Such prints should only be attached to the mount at the edge. 3. The developer employed by Herr Wothly, and published in our Year-Book, meets with general approbation when tried. We are glad that you find it answer so well.

H. R. W.—The stop placed between the components of a double lens should occupy a position governed by the respective focus of each component. If the front and back lens were alike in focus, the stop would be placed midway between; if the front lens had a focus of twelve inches, and the back lens a focus of six inches, the stop would be placed two-thirds of the space between from the front lens, and one-third from the back lens. In your case, the front lens having a focus of 9⅜ inches, and the back a focus of 11⅜ inches, the stop should be placed nearly in the centre, but a little nearer to the front lens. 2. One of the cheapest works on elementary optics is that in Chambers' Educational Course. 3. If you perfectly exclude other light, and then look somewhat obliquely, you can see the image of the camera without the ground glass. Of course you cannot see it if you place your eye in the plane of the ground glass, any more than you can see any object or image if the eye be in the same plane as the object or image.

D. W. Black (Boston).—Thanks for your letter and photographs. We examined the balloon photographs with much interest. We remember the publication of the details some years ago.

R. H.—We prefer the design without any flat at the top; but we should recommend an ordinary ridge-roof as simpler and better than either.

W. Notman (Montreal).—Thanks. We shall notice the pictures shortly. We should strongly commend you to adopt the cabinet size for portraits, already beginning to be recognized in this country. Uniformity is important; the 5½ by 4-inch size has already the start here, and Messrs. Marion and Co. have made albums for them. We will send you an example of the new size shortly.

John Mackay.—We have published many forms of the bichloride of mercury intensifier in the News, and several are given in our Year-Book. We can only briefly recapitulate some of them here. Make a 10-grain solution of bichloride of mercury, and apply to the finished negative until it is of a uniform grey tint; then wash and apply a 1-grain solution of iodide of potassium until the negative is of a greenish grey tint. Or, instead of the iodide, follow with a solution containing one grain of hyposulphite of soda in an ounce of water; this will produce a black negative. Or, make a 20-grain solution of bichloride of potassium, and an 8-grain solution of chloride of gold; take a drachm of each, and add to two ounces of water. Apply this mixture to the negative until the requisite density is obtained. 2. We prefer the second maker you mention.

R. F.—A strongly salted paper requires a strong nitrate bath. If your paper contain as much as twelve grains of salt to the ounce of albumen solution, you will find it safe to employ a 60-grain nitrate bath. 2. Our objection to the use of carbonate of soda for neutralizing the toning bath arises from the fact that, unless used with judgment, it produces mealy prints, inert baths, &c. Employed with judgment, it will yield excellent results, but it is not a keeping bath; the quantity prepared should be used the same day. 3. The magnesia bath has an advantage in the fact that it is impossible with it to get a very alkaline bath, hence it is a very safe agent to use. 4. A final application of hot water certainly assists in removing the hypo, and does not injure a good print. 5. It may be assumed that a deeply-toned print will probably be more permanent than a lightly-toned print.

F. M. R.—Carbon tissue should certainly dry in twelve hours. If it require more, it is probably hung in a damp place. The crystallization on the surface, of which you speak, arises from the tissue having remained too long in the bichromate solution.

L. Field.—Our opinion, formed from a careful examination of your new printing-frame, is very favourable. We shall devote our earliest leisure to a practical trial, and then we shall report more in detail.

James Maycock, R.N.—See prices of advertising on advertising sheet of present number.

Several Correspondents in our next.

Photographs Registered.

Messrs. Jas. Russell and Sons, Chichester,
Four Photographs of H.R.H. the Prince of Wales.
Photograph of H.R.H. the Duke of Edinburgh.

Messrs. M. Allen and Co., Dublin,
Photograph of the Lauret Frères.

Mr. Edwin Flukes, Bath,
Photograph of Wells Cathedral.

Mr. George Lydforn, Shaftesbury, Dorsetshire,
Three Photographs of Lady Theodora Grosvenor.

Rev. T. M. Raven, M.A., Bedale,
Two Photographs of Scruton Church before Restoration.

Mr. J. H. Mackay, Thomas Town, Merthyr Tydfil,
Two Photographs of R. T. Crawshaw, Esq.

Mr. George Gaeen, Ledbury, Herefordshire,
Photograph of J. W. Mutlow, Esq.

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THE PHOTOGRAPHIC NEWS.

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CABINET PORTRAITS.—A NEW IMPULSE FOR PORTRAITURE.

A general conviction prevails amongst portraitists that the rage for cartes de visite is over; that although a constant demand for the card as a convenient form of portraiture will doubtless be permanent, the collection and exchange of card portraits as a fashion amongst all classes of society, to which the enormous demand which prevailed during a few years was due, cannot be looked for again. It was natural that such a rage should subside. All fashions have their brief day: and in those branches of commerce more especially dependent upon the caprices of public taste, it is regarded as the shrewdest enterprise not to endeavour to foster or prolong the public interest in a waning style, but to develop as promptly as possible a new taste, and, by skilfully "forcing the cards," create a new fashion, and this sufficiently distinct from the last to render it imperative in everyone influenced by such things to purchase a new equipment, the old fashion and its belongings being *passé*, and incapable of modification or renovation.

Without pushing the comparison between professional portraiture and millinery or mercery too closely, so far as they are each influenced by the variations and tides in public taste, and the demand for each governed much by fashion, there can be no impropriety in deriving a hint from the usages of one for the practice of the other. Little more than half a dozen years ago the card picture was first introduced to the public as a speciality. In 1861 the tide of fashion for this style had fairly set in, and continued flowing with increased impetus for three or four years, giving an impulse to photography which it had never known before. The usual results followed: with increased demand came increased competition and reduced price. Many additional photographic establishments were opened, and kept fully employed. Good photographic portraits, when demanded in large numbers, were produced and sold at as many pence each as at one time they would have cost shillings. Now the tide has turned, the demand has subsided; many establishments are left comparatively idle; the prices, already low, are by some, making a spasmodic effort for existence, reduced still lower, and we hear frequent complaints of a sad declension of the prosperity of professional portraiture. Some gloomy vaticinators see the gradual decline of photography inevitable: they think the time must come when everybody will have had his or her portrait taken, and there an end of the whole business. We need not here dwell on the fact that so long as generation succeeds generation, and as long as human affection and human vanity exist, photographic portraiture will certainly be in demand. The question is, can photographers assist in increasing or creating additional demand? We think they can, legitimately; and that they may serve the public, the art, and themselves at the same time, by the introduction of an improved style of portraiture, which, possessing some of the same elements of popularity which characterised the carte de visite, is sufficiently different to create a new fashion, and to tempt all who bow to the influence of fashion not simply to sit themselves, but to collect a series of the new style of portraits.

We think that this new impulse may be given to the professional practice of the art by the judicious introduction of the new Cabinet Portraits. But to do this, photographers, as a body, must be true to themselves, and manifest something of *esprit de corps*. The thing can only be done successfully by perfect unanimity and consentaneous action. If every photographer of influence and position throughout the country would proceed to produce specimens of the new size, all adhering rigidly to the exact proportions, so that the pictures, wherever produced, are uniform with all others in this respect, and push them on the attention of their sitters, we have no doubt that this, with the real merits of the pictures themselves, would soon create a demand which, once well commenced, would necessarily be progressive. Messrs. Marion and Co. have already made albums for the new size, and when the public have once been induced to purchase albums, they will not rest satisfied until these albums are filled; and so the impulse will be continued. Before entering further into the legitimate modes of pushing the matter, let us glance at the real merits of the style of picture.

The Cabinet Portrait, as already introduced with great success by Messrs. Window and Bridge, is something like an enlarged carte de visite, but of better pictorial proportions. The proportions are as follows:—

Mounting card ...	... 6½ in. by 4¼ in.
Picture	... 5½ " " 4 "
Aperture in album ...	... 5¼ " " 3⅞ "

It will be seen that the picture will resemble the card portrait in general form, and in possessing a narrow margin all round, and a wider margin at the bottom, where the artist's name, &c., are printed. The cabinet portrait is, however, a little wider in proportion than the card, in which it possesses a great advantage. The latter once introduced of a given size, was of necessity kept the same size; but there can be little doubt that the proportion is not the best which could have been chosen: it is too narrow, both for pictorial effect, and frequently for the purposes of portraiture. How often it happens that a portion of the flowing drapery of a lady is cut off in the present picture, or that, to retain the drapery, the figure is placed in a position which suggests that it is just escaping out of the picture. It is also too narrow for pictorial effect, and certainly too narrow if judged by the standard sizes of canvas employed by painters. The new size is symmetrical in itself, and, whilst offering facilities for bold and graceful portraiture, admits of such introduction and arrangement of accessories as contribute materially to pictorial effect. The examples before us, by Messrs. Window and Bridge, consist of full-length figures, like the ordinary card picture, three-quarter figures vignetted, and busts vignetted. The effect is exceedingly pleasing. The pictures are sufficiently large to give value and distinctness to the portraits, whilst the effect of finish and completeness due to the accessories, &c., in the card style, give the pictures a great superiority to the old bald 5 by 4 pictures, common before the days of the card mania. Mr. Notman, of Canada, as we mentioned in our last, recently sent us some examples of a similar class of picture he was thinking of introducing. This was a little smaller than the cabinet portrait, and followed more exactly the proportions of the carte de visite. The pictures were exceedingly pleasing, but we think the size an error. The effect was too much like that of an ordinary card slightly enlarged, from which it was not sufficiently distinct to make any revolution, or cause any new demand. The cabinet portrait has already been successfully introduced by some establishments, both in London and the country, and, as we have said, Messrs. Marion and Co. have already made albums for them. These are strong reasons for steadily adhering to a good size. Any diversity in the size would at once damp the ardour of the public. If, in making a collection, it is found that sizes vary, and will not fit the album, the general impulse given would be materially checked. Hence the importance of photographers acting with unanimity.

This unanimity is not necessary only to maintain the demand once created; but to initiate it successfully. The new size should be introduced simultaneously all over the country, and, if possible, in America and on the Continent. Nothing so readily produces an insensible conviction of the truth of any statement, as hearing it constantly reiterated. Nothing will so effectually convince the public of the beauty and importance of the new size, as seeing it everywhere: in specimen cases; in reception-rooms; in publishers' windows. This will create the fashion, and convince the public that the fashion exists. This conviction once forced on the public mind, such a fashion will certainly prevail for a period.

The introduction of the new size will cost photographers little or nothing. There is no permission of any patentee to be obtained; it will involve the purchase of little or no new apparatus. A good half-plate or whole-plate lens will answer; half-plate glasses and half-plate camera will also be used. Should the style be well introduced, and the demand become important, it is probable that lenses especially constructed for the purpose may be introduced. In the meantime, a good French whole-plate, or the well-known English half-plate lens, or a rapid half-plate like the 3 B of one of our English makers, will answer well. Pictures produced of this size will pay the photographer satisfactorily at just double the price of ordinary cards, the amount of material employed being little more than double that of cards, whilst the labour is of course not double. In proportion as the size is larger, this style will make a somewhat increased demand upon the skill of the photographer to produce good results, artistically and technically; but it also affords, in the same ratio, ampler scope for the ability of the skilful. Whatever tends to render necessary the exercise of higher capacity in the operator, is in our estimation a boon to the art, and in this respect the introduction of the new style will act beneficially. From a hearty, spirited co-operation amongst photographers for their mutual benefit, we can see a great advantage possible, whilst the effort cannot in any way interfere with the success of any other branch of the art. We subjoin some extracts from a letter we recently received from Mr. Window in answer to some enquiries we made. We especially commend attention to his suggestion as to flooding the windows of dealers with published portraits in the new size, as one of the readiest means of arresting public attention by a novelty in the form of portraits intended for wide distribution. Mr. Window says:—

"I fully agree with you respecting the necessity of unanimity amongst photographers when essaying to introduce a new style. With it 'l'affaire marcherait comme sur des roulettes,' and without it all pains and trouble incurred by one or two houses must prove in vain. The size I have selected was chosen, not at haphazard, but after some considerable thought. I wanted to make a picture *and* a portrait. The shape of the carte de visite was against this last, as its size was against the perfection of the first. I also wished to adapt it to the capabilities of the materials to be found in most studios. The selected size is proportionately wider for its length than the C. D. V., and while giving a portrait that needs no glass to examine it by, shows more suitably the surrounding objects. The want of this extra width has caused much of the crowding so objectionable in the works of many even of the better class of artists. They can be taken with a whole-plate lens, though a 3 B or 4 B is better; and they go well upon a half-plate, leaving a sufficient margin for thumb-corners and draining-marks, which are not to be avoided. I find in my own practice that they are very readily taken, and still more would prefer them to the C. D. V., but that they know their friends have not albums to hold them. I believe there is but one way to get over this difficulty, which once overcome, would open to photographers a new career. The pictures must be largely exposed in shop windows, and sold, albums for them being sold in the same shops. Of course the album once purchased, the owner's desire will be to fill it with his friends' pictures, *hinc illæ lachrymæ*. This is entirely in the hands of photographers themselves. Hitherto, as generally, the principal profit has gone to the dealers. Let all photographers get negatives of as many public characters as they are able, and send a proof of each to Messrs. Marion. When these last have a certain number that may be deemed sufficient—say 150 different people—let them simultaneously be placed in all the windows, with the intimation that albums for them may be bought within, and there is no doubt that the sheep will come leaping over the wall. I think, unless some such course as this be adopted, that we shall never succeed in generalizing the style sufficiently to give it a real *locus*. My firm has already taken about twenty public negatives, and we are gradually increasing and adding to the number. In our private practice, we expose them on our table, plain, coloured, in mounts made specially for them, and very suitable for hanging, and in albums. We find the mounted and coloured ones go off very freely, and even during this time of depression we have not had to complain, owing solely to these cabinets, of which we take two to one of the C. D. V.'s. For our part we give six copies for a guinea, and three vignettes for the same sum, and we find that price considered moderate. But each photographer must suit his terms to his customers; and this would be too dear for many, while perhaps some could command a higher price.—Yours very truly,

"Fred. Window.

"63a, *Baker Street*, *Portman Square*, *W.*, *8th August*, 1866."

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BRINCKERHOFF'S PORCELAIN PAPER.

Improvements in the texture and surface of papers for photographic purposes must always interest photographers. Notwithstanding the universal use of albumenized paper, there is a general feeling that, apart from its more than suspected influence in causing instability, it has not the most suitable surface for many pictorial purposes. We noticed in our last the fine results obtained by Mr. Arthur Taylor by the use of shellac for preparing the paper. A few months ago we described the examples shown to us by Mr. Anthony, produced on "Brinckerhoff's porcelain paper," the mode of preparing which was then a secret, the process having been just patented. We have now received the complete specification, and can place the details before our readers.

Various patents have been obtained for improving the surfaces of photographic paper, the majority of which are, singularly enough, for precisely the same thing. In 1853, Henri Joseph Scoutetten patented a method of rendering impermeable paper for photographic purposes, which consisted in immersing it in a solution of india-rubber or gutta-percha in purified sulphuret of carbon, and then rolling thoroughly. Five years afterwards, Mr. Alonzo G. Grant entered a provisional specification, describing a method of rendering paper for photographic purposes insoluble by means of a solution of india-rubber and other resins; and more recently, a method has been patented of rendering the paper impermeable by means of india-rubber previous to albumenizing. In 1855, Mr. Mayall patented a method of preparing a substitute for paper for photographic purposes, which was a form of artificial ivory. In the specification various modes of producing such a substance are included; but amongst other things, we find sulphate of baryta and albumen, or gelatine, made into sheets or slabs, and rendered insoluble. This process was given up because the material, although insoluble, absorbed and retained the various salts employed in solution with great tenacity, and was altogether unmanageable. It was impossible to get rid of the hypo, and the pictures were far from permanent. When, at the December meeting of the Photographic Society, Mr. Anthony exhibited some specimens on the porcelain paper, Mr. Mayall hazarded a conjecture that some of the materials employed in his artificial ivory were used, and added a suggestion, as the result of his experience, that although these materials were unsuccessful when used to form the fabric on which the photograph was produced, they probably might be used with advantage for preparing the surface of paper. Singularly enough, when the specification comes before us, we find these materials are employed. A preparation of kaolin or sulphate of baryta and gelatine is applied to the paper, after which it is treated with a solution of alum, tannin, or other suitable substance, to render the gelatine insoluble. The result is a hard, smooth, pure, white surface, not readily permeated by aqueous solutions, giving a very pleasing texture to the finished photograph.

So far as we have been able to judge, the result is for many purposes an improvement. Although the materials have been employed before, and the use of gelatine and alum for rendering paper impermeable to moisture is well known, it is probable that the new combination for a specific purpose will constitute a valid patent. There is one caution to be observed, which, as the working of the patent is in the hands of an intelligent photographic firm like that of Messrs. Anthony, will doubtless receive attention. In the specification of the patent we observe no provision for washing the paper after the application of the alum solution, to remove all which has not combined with the gelatine to form an insoluble compound. Alum, or sulphate of alumina, in the photographic paper is a somewhat dangerous material, and, coming into contact with the hyposulphite in the fixing bath, will produce a decomposition, in the process of which sulphurous acid is liberated, which will form a sulphide of silver in the print, and endanger its permanency. The prints we saw in the hands of Mr. Anthony, however, showed no trace of such action, and we may fairly presume that due precaution against the danger is taken in the preparation of the paper. The specification is as follows:—

The paper usually employed in photography is of a porous and fibrous nature, and in being passed through the solutions that are employed in the production of the photographic image the picture loses its force and brilliancy in consequence of its sinking into the tissue of the paper. Albumenized paper has also been employed, and although the image does not sink into the tissue, there is an objectionable gloss and harshness to the picture. With the first-named paper the image is liable to fade and become discoloured, in consequence of the difficulty of entirely removing by washing from the porous paper the substances that subsequently cause the picture to fade. With the albumenized or non-absorbent paper, difficulty is experienced in applying colours, because they remain upon the surface of the paper, giving an objectionable harsh appearance.

The object of my invention is to produce a surface upon paper, or other material, that is of a fine cellular character, adapted to the reception of photographic or other pictures, or for other uses in the arts, said surface being sufficiently absorbent to receive the image, but not to lessen its brilliancy, bearing out and producing all the strength of detail in the picture without the unpleasant gloss and harshness of pictures on albumenized paper; at the same time said surface is of a nature to receive either oil or water colours, and, when employed in photography, said paper or surface is not dissolved by the solutions made use of, and hence can be freed with facility, by washing, from the substances, which, if they remained, would injure the picture or cause it to fade. I make use of a thin solution of gelatinous materials and kaolin or terra alba, which I prefer to employ hot, which solution penetrates the pores of the paper or other material being prepared; I then submit the said material to the action of an astringent, such as alum or tannin, which, combining with the gelatinous material, forms a fine cellulose surface that is insoluble in the solutions employed in photography, and which, penetrating the pores of the paper, fills them, and also produces an even smooth surface by enveloping and holding down any fibres that otherwise might stand up on the surface of the paper. I take French gelatine, or other material of a gelatinous nature, and soften the same by soaking it in water, and then heat the same by a water or steam bath, to completely dissolve it, using about three ounces of gelatinous material to a gallon of water. To this I add about six ounces of kaolin or terra alba, or other material, according to the colour required; mix the same thoroughly, and strain it. Into this solution, while hot, the paper or other material to be prepared is dipped, and then allowed to dry or partially dry. I take a saturated solution of alum, and dilute the same with two parts of water to one of said saturated solution, and submerge the paper or other material in the same for about five minutes, and then remove and dry the same in any convenient or desired manner, and the material will be found to possess the fine cellular character before mentioned. The proportions of the materials may be varied, if required, for any particular character of paper or surface to be produced, and tannin or any other astringent substance that will act on the gelatinous material might, under some circumstances, be employed in place of alum.

The paper prepared in the aforesaid manner is much stronger than before being prepared, and, not being dissolved by the solutions employed in photography, is much more easily manipulated in the subsequent process of toning and fixing the picture; and the washing can be performed much more easily and perfectly than heretofore, because the solutions employed do not become so much incorporated in the paper. The surface prepared in this manner has an appearance somewhat resembling finely ground porcelain, and is equally effective in rendering the picture clear and handsomely developed, without the risk of being broken that exists with pictures on porcelain. A solution of borax may be employed in place of alum to combine with the gelatine and form an insoluble compound as aforesaid. In place of employing kaolin, I make use of sulphate of barytes mixed in with the gelatine to give the white colour, or said sulphate of barytes may be produced by mixing nitrate of barytes with the gelatine, and then the alum solution effects a double decomposition, forming sulphate of barytes.

What I claim and desire to secure by Letters Patent is, the method herein specified of preparing paper and the surface of other materials for use in photography, for the purposes and substantially as specified.

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DEATH FROM INHALING FUMES OF CYANIDE OF POTASSIUM.

We have often lately condemned, in strong terms, the habitual use of cyanide of potassium in the dark room, as unnecessary, and unfavourable to health. So many cases of its injurious action have come under our attention, that we have felt compelled to reiterate warnings. If its use were necessary, in any degree, we should simply urge constant caution in employing it: as it is unnecessary—hyposulphite of soda doing the work really better, and requiring but little extra care in washing—we condemn its use for fixing altogether. Its fumes, constantly inhaled, as we have often pointed out, are dangerous to health. We point the cautions we have often published by the following paragraph from Thursday's *Times*, detailing a death from breathing these fumes. Photographers do not, it is true, use hot solutions; but it is better to avoid altogether the use of an unnecessary and dangerous article.

An inquiry was held by Mr. Richards, deputy-coroner, at the "Bridport Arms," Salisbury Street, Hoxton, touching the death, from inhalation of cyanide of potassium, of Frederick Poller, aged 28 years. The deceased was a compensation-balance maker, living with his father, a watch-maker, at 2, Salisbury Street, New North Road. On Thursday last, his mother and sister went out, leaving him alone in the house. Upon their return in the evening they could not get admission at the front door, and they went round to the back, where he was found lying on his face in the doorway leading into the garden. He was quite dead. He was a very respectable young man, and there was no suspicion of suicide. A vessel containing a quantity of cyanide of potassium was found in the parlour. He used that poison in his business, and it appeared as if he had heated it upon the hob, and, upon taking it up, had inhaled a quantity of the fumes, and then rushed to the garden to get air, but had dropped dead in the gateway. Dr. C. E. Cockerton said that the *post-mortem* examination showed that the deceased had been in perfect health. The lungs were pervaded by a strong smell of prussic acid, the essential principle of cyanide of potassium. There was a similar odour in the stomach. The witness considered that the deceased might have inhaled a great quantity of the fumes of cyanide of potassium, and that his death was caused in that manner. The jury returned a verdict that deceased died from the accidental inhalation of the fumes of cyanide of potassium.

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PHOTOGRAPHY IN THE ALPS.

Mr. Ernest Edwards, in his "Notes by the Photographer" to the handsome volume noticed in our last,* gives an interesting account of the equipment, materials, and manipulations he found efficient in the arduous and sometimes perilous task of producing a complete series of glacier illustrations. Some extracts will be found interesting, as well as suggestive and instructive. He says:—

"In selecting the apparatus for my purpose, from the nature of the work to be done, two objects were required to be kept in view,—first, that it should be as light and compact, and next that it should be as strong, as possible. These difficulties were not lessened by the decision that had been arrived at, that it was necessary to provide for taking pictures of at least three different sizes, and that the smallest number of negatives to be taken of each view should be four.

"By very careful planning, by the saving of every ounce of weight and every inch of space that was not actually needed, the whole of the apparatus, including no less than eight different lenses, with a supply of chemicals and plates for three days—and such toilet requisites as were necessary for my own use—were stowed in two small cases which could readily be carried by one man, the 'legs' of camera and tent being extra.

"The first case comprised the dark tent, which was a modification of form known as Edwards', and may be thus described:—The outward shape presented the appearance of a wooden knapsack, being complete in itself, with the exception of its stand, which was carried along with the camera legs. On its being placed on its stand and prepared for action—this process occupying about three minutes—the operator finds the lid of the box transformed into a washing-tray, from which a pipe carries away the waste to the ground; at his left hand is the nitrate bath let down into a bag, the top of the bath being about an inch above the surface of the tray; and to prevent any chance of any foreign matter entering this, a waterproof covering is provided. In the upper left-hand corner are placed the various bottles of chemicals, each in a cell to itself, and comprising two six-ounce bottles (glass) of collodion, bottles of iron and pyro developers, silver solution for deepening, and cyanide for fixing (all in gutta-percha bottles), besides developing-glasses, dusting-brush, and blotting-paper. Immediately under these is a cupboard, exactly the size of the plates used, viz., eight inches by six, arranged for the reception of them in a partly finished state, where they may be kept damp till the end of the day, or till a convenient opportunity arrives for their completion. By the method employed in the construction of this cupboard, I have on occasion, and during summer, kept plates wet for three days. This arrangement proved to be of great value. The importance of making the most of good light cannot be overrated, and by this means I have been able to take as many as twelve subjects in one day, striking my tent for this purpose six different times, and getting over as well a considerable distance of glacier walking. Moreover, a very large amount of water is required for finishing the plates; and though this can usually be obtained in abundance on the surface of a glacier, yet this advantage ceases on going beyond the snow-line, or up such mountains as the Sparrenhorn and Torrenthorn. In all such places I found it essential to economise to the utmost the scanty store of water which could be carried with me, or I could not have obtained half the pictures actually taken, and to this end the arrangement for keeping the plates in a damp state materially contributed.

"To continue the description of the tent. Opposite the operator again, but at the right-hand side, is a large window of three thicknesses of yellow 'tammy,' or calico, which can be easily opened and shut from the inside, the box itself, at this part, forming the shelf on which to put stray bottles and developing glasses; and finally, hanging from the right-hand corner, is an elastic tube, with an ingenious tap, which conveys the water-supply from a large zinc cistern placed outside on the top of the tent, where it can be filled and re-filled at pleasure. The operator, having seated himself on his camp-stool, which folds up and goes with the legs, has merely to draw over himself the light-proof covering attached to the tent, and kept in its place by two very light iron rods, to commence his work. He will find everything in its place, and everything to his hands, with plenty of elbow and head-room, to go through or modify his operations at will. When the tent is packed up, both the nitrate bath and the water-tank find places among the other apparatus within the case.

"This arrangement, made for working 8 by 6 inch pictures, measures 13½ by 17 by 6½ inches, and weighs, with a full complement of chemicals and *every* necessary except the camera and legs, 17 lbs. It would be perfectly simple to arrange for the camera also being carried in it; but I have not found this advisable or convenient, for this reason: on arriving at a promising subject, the camera only is first put up; the selection of the view is then made; and this, which is seldom effected without a good deal of consideration and running about, being decided on, the tent is unpacked as near to it as may be convenient. It being important to save frequent shiftings of the tent, we generally pitched it, if possible, at a place near which several views were wanted; and since it was not safe to convey the prepared plate a greater than about three minutes' walk, we had to choose a centre spot between three or four points of view. During all this delay the tent remained packed up, avoiding the possibility of any accident to its contents; and if, as occasionally happened, no suitable view could be found, the camera only had to be repacked. Moreover, we generally found it possible to carry about the camera, after the first picture of the day had been taken, without repacking, it being fixed so firmly on its stand as to travel very easily, tilted over a man's shoulder like a sloped rifle; and then it could be set down, and a proposed view examined through it, without a moment's delay.

I have been thus particular in describing this pet tent, because experience has convinced me that success in landscape photographing greatly depends on the photographer feeling himself at ease in his tent; the feeling generally being that of a make-shift. I lay claim to nothing particularly original in this arrangement; it is merely a collection and adaptation of a number of small improvements which are but trifles, but tend to make up a perfect whole which is no trifle."

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* "The Oberland and its Glaciers, Explored and Illustrated with Ice-axe and Camera." (Bennett.)

Another small case, made of leather, contained his Kinnear camera (eight inches by six inches, taking two pictures of half the size and four of one-fourth the size), lenses, plate-box, focussing-cloth, extra chemicals, &c. The whole equipment was thus comprised in three manageable packages,—tent, camera, and legs. The collodion was Rouch's bromo-iodized, mixed for some weeks before use. A singularly weak developer was used. Mr. Edwards says:—

"The developer was a very weak solution of iron, sometimes not more than a grain to an ounce of water, with a good dose of restraining acid. Even under these conditions, and using the smallest stops supplied with the lenses, the exposures were found to vary from one to ten seconds only. It is to be remembered, however, that I was photographing in the middle of vast snow-fields, from which the glare was so great as to render necessary, to make the light even bearable, the wearing of coloured glass spectacles; and, sometimes, in addition, linen masks, as a protection for our faces. After the application of this weak iron solution and a careful washing, the negatives were stored away in their dark box in the tent, and, in this state, kept till the day's work was over, when they were all deepened together with the ordinary pyro and silver, and fixed with a very weak solution of cyanide."

Mr. Edwards remarks:—"The reason why glacier scenery is so well suited for representation by photography—namely, that except in details it exhibits no great variety of colours—causes at the same time one of the great practical difficulties in obtaining the pictures. On a sunny day the contrasts of light and shade are so violent, that shadows are too apt to come out very nearly black in a photograph."

This tendency to contrast induced Mr. Edwards to employ the weak developer to which we have referred. He doubtless satisfied himself that, under the circumstances in which he was working, this course was best; but in our own experience a weak and slow developer has generally increased contrast by favouring the tendency to aggregation or increased deposit on high lights, which is generally found to exist where prolonged development is necessary; whilst a strong developer, rapidly throwing down all the free silver present, effects this in the most uniform manner, giving the most harmonious negative.

FURTHER HINTS ON THE COLLODIO-ALBUMEN PROCESS.

BY THE HON. NASSAU JOSCELYN.

So much has been written about collodio-albumen, and such minute details have been afforded as to working it by its most skilful advocates, that I hardly venture to offer these few remarks upon the subject.

There are, however, one or two points in its manipulation which have not, as far as I have seen, received the attention they deserve, and which are most important where uniform success is to be attained.

The superiority of this king of dry processes over every other, as far as beauty of result and certainty are concerned, few will venture to dispute, standing as it does quite by itself as virtually an albumen, and not a dry collodion process, the collodion playing altogether a minor part in the matter. It should therefore not be classed with those processes, where the image is formed in the collodion film alone, and where success generally involves delicate chemical combinations, under conditions which are continually subject to change.

First, then, as to blisters. I should recommend any one wishing to be *certain* of avoiding these, to give his glasses the preliminary coating of dilute albumen recommended by Mr. Mudd. The neatest way of doing this is to have a thick paper tray containing the carefully-filtered and diluted liquid, and having attached a plate-holder, and removed all dust from the surface of the albumen with a strip of paper, to gently lower the face of the plate on to the surface, without of course wetting the back.

When this has been done, it may immediately be lifted off and drained in a tumbler against the wall. The next plates may be lowered on to the albumen without using the paper, and so a couple of dozen may be albumenized in ten minutes. This should be done rapidly and without moving the body about, so as to avoid dust. When all are done, slip quietly out of the room, and let them dry.

It is a good plan, when draining in tumblers, to have a long strip of blotting-paper to place under the angle of the plate when it has ceased to drip. It accelerates the drying very considerably.

It is curious how difficult it is to get rid of *all* the free nitrate of silver from a collodion plate, which, however, *must* be done if the picture is to be first-rate. I generally have a dipping bath of distilled water, into which the plate goes after leaving the silver bath and draining. It is left there till the next plate is in the bath, and then washed gently in two changes of common water in a tray. Then I place it for a few moments in a weak solution of salt in water, or iodide of potassium, and finally allow the tap to run once all round the edges. The plate is then *well* drained and *thoroughly* albumenized, after which it is allowed to dry *spontaneously*. If a preliminary coating of albumen or india-rubber have been given, there is no occasion to bake the plate, which was only recommended to insure freedom from blisters.

Again, the washing after the aceto-nitrate bath is just as important, and must be most thoroughly done. I use first distilled water, then salt and water, then tap washing, and finally a flush of distilled water holding in solution a few grains of gallic acid. This involves no additional trouble, and insures fine plucky negatives with full detail, and also keeping qualities superior to those usually obtained.

I have had a good deal of bother with surface reduction during blackening up, especially when using citric acid as low in proportion as recommended by Mr. Mudd; and whatever may be said as to rubbing off the veil with cotton wool, I think such a proceeding very undesirable, and I have always found it more or less injurious to the surface; so that if a negative can be developed without such mechanical assistance, so much the better.

I should advise increasing the quantity of citric acid to one grain per ounce, and paying especial care to the washing after sensitizing. If this be done, success is actually CERTAIN.

British Legation, Florence, August 8th, 1866.

ON THE PRODUCTION OF PHOTOGRAPHS IN PERMANENT COLOURS.

MM. BEYSE AND JOSS' METHOD.*

By this method, which does not necessitate the employment of any special appliances, any photograph may be fixed in colours. It is a process of direct and indirect painting combined, the colours applied or developed impregnating the albumenous film of the paper, and becoming perfectly insoluble. The fluids used for developing the colours offer a wide field for experiment to every photographer who is at the same time somewhat of a chemist. It may be possible to discover, among the many organic and inorganic compounds of this nature, a substance which has the power of developing all the required colours at one time, and with the attainment of this result, the great problem of photography will be solved.

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* Photographische Correspondenz.

With a view to experiments being still continued in this direction, it has been considered desirable to publish MM. Beyse and Joss' method of colouring, in order to show the actual amount of progress which has already been made, disregarding, in the cause of science, any loss of capital which the experiments have already cost, or any pecuniary benefit which might perhaps have been derived from them.

Some amount of skill and knowledge of colours are required in carrying out the process successfully, and if good negatives are employed, very fine pictures may be obtained. Moderate negatives, with even the most skilful treatment, yield but very poor results. The method employed for producing the negatives is quite immaterial, so long as good ones are procured.

Proofs are taken from the negatives in the ordinary manner, and inasmuch as they will be exposed to the action of light for some time during treatment, it is necessary that they should be vigorously and somewhat over-printed. Care must be taken in selecting the proper kind of albumenized paper, as the result of the experiment depends very much upon its quality. The paper yielding the best results is that known in the trade as four-fold albumenized paper, and this should always be quite fresh when used.

The picture, on being taken from the printing frame, is carefully washed in a darkened room, to free it from any superfluous nitrate of silver. When washed, it is laid on a glass plate on the developing table, and a few sheets of filtering paper are placed over it, to remove the superabundance of water clinging to the print. The filtering paper is pressed gently against the print once or twice, so as merely to remove the glossy appearance on its surface caused by the impregnation of water, and must not be allowed to dry the picture to any extent. If it is not desired to proceed immediately with the colouring process, the prints may be hung up and dried, and stored away in a dark place till required; but much better results are obtained if the prints are at once treated with the different colouring solutions.

In carrying out the details of this system, it was found that deeply-printed pictures, when taken out of the pressure frames and washed, were not nearly so sensitive to light as it is generally supposed. This is not due to any chemical action, but evidently to the presence of water, which renders the surface of the print bright and glossy, and thereby reflects the light instead of absorbing it. Further experiments must, however, be made in this direction before this hypothesis can be substantially established.

Before explaining the mode of proceeding, it is necessary first to say a few words respecting the developing table, and the work-room in which it is situated. The room should have a northern aspect, so that direct sun rays may be prevented from falling upon the unfixed pictures. The developing table is placed before a window, which should be so constructed that light is admitted through the upper portion only, and does not expose the table to full daylight. A row of bottles containing the colouring solutions is placed on the table ready for use, and near them is a rest for holding the paint brushes, all of which should be labelled to correspond with the different bottles. Each fluid is laid on with a separate brush, so that no time is lost in washing out the brushes, and the solutions are never contaminated with one another. Strips of filtering paper are laid ready for use at one end of the table. Near at hand, on another bench, are vessels containing the toning and fixing solutions, which are in charge of another workman. It is more convenient to have the arrangements for washing and drying the prints likewise in the same room.

When the picture has been drained from the extraneous water by pressing the filtering paper against it, the operator dips his brush into the carnation solution No. 1, and keeping strictly to the outlines, applies it abundantly to the face, hands, neck, &c., of the portrait, without respect to light and shade. It is necessary carefully to prevent the solution from touching any portion of the inner eye, as the black photographic tone is thereby changed to a light bluish-yellow colour. This carnation solution No. 1 contains hyposulphite of soda, and must therefore be very skilfully handled; any flesh tint may be obtained with it, even from the freshest to the most sallow complexion. One or two minutes is sufficiently long to allow the fluid to remain on the portrait, as far as regards the flesh tints; at the expiration of that time, at the discretion of the operator, the superfluous solution is removed by laying a strip of filtering paper carefully upon the picture, and keeping it well in contact for a short time, till the painted portion exhibits only a slight lustre. The pieces of filtering paper must never be used a second time, as they contain traces of hyposulphite of soda, and are therefore liable to spot the picture. All gold ornaments on the picture are treated with this solution, which is allowed to remain in contact till a yellowish colour is obtained. Bright red portions of the dress should be treated in like manner, but such parts require to be manipulated a second time after the print has been fixed, as hereinafter described.

Fair hair, or light-coloured beards, are next treated with the blonde solution, which is applied uniformly and very lightly. It should only be allowed to remain momentarily in contact with the print, and it is then blotted off with filtering paper. If it remains on the picture for any length of time, the beard and hair become of a bright red colour. With this solution, therefore, the operator may, by careful management, obtain any tint of colour from blonde to red, and by modifying its constituent ingredients, any shade of blonde is easily secured. Any portions of dress required of a brownish or fiery red colour are likewise treated with the blonde solution, which is not removed from the print till it has changed those parts to a glaring red. Brown hair, brown eyes, and brown beards, are treated in a similar manner with the same solution, and the liquid blotted off when the required gradation of colour has been obtained. Much care is required in controlling the duration of time required to effect the different changes, and in developing the colours, as the toning bath has the effect of slightly weakening them.

The wooden furniture in the picture is treated with a brown solution, which should be manipulated in the same manner as the others, and can be so controlled as to furnish any required tint, from cherry-wood to the darkest mahogany. Yellow portions of the picture are produced by any of the yellow solutions Nos. 4, 5, and 6; but very brilliant yellows must be touched up again after the print has been fixed.

The operator must acquire a certain skill and speed in performing these different operations, as it is absolutely necessary that they should be all completed while the print remains moist. Should the print become dry before the process is concluded, it must be again dipped into clean water, and the extraneous moisture removed with the filtering paper. It is only by keeping the print damp during treatment that the colours remain perfectly fixed in the albumen, and are then neither affected by sunlight nor soluble in water; it also has the effect of giving the colours a soft tone, and causes them to blend into one another in a most perfect manner. The moistened state of the picture, moreover, allows the colours to be laid on uniformly without spotting, and gives them a transparency which is never attained by any other method of colouring.

When the prints have passed through this colouring process, they are handed to an assistant to be placed in the toning bath; or they may, if prepared, be kept floating, face downwards, in a vessel of water, to be toned and fixed a few hours later. In the same way that great care must be exercised in the selection of albumenized paper for this work, so also is it necessary to be very careful as to the method employed for toning and fixing the pictures. After many laborious experiments, the following formulæ have been found to answer best:—A gold solution is made by dissolving a drachm of the double chloride of gold and ammonium in 7½ ounces of distilled water, and likewise a soda solution containing 50 grains of citrate of soda dissolved in 8 ounces of water. Both solutions should be prepared a day or two before they are required for use. The toning bath is made by adding to every ounce of the citrate of soda solution twelve drops of the gold solution; but should the toning of the pictures not proceed as quickly as desired, another drop or two must be added. The same toning bath may be used for four successive days, providing that, after each day's use, it is carefully filtered and the requisite proportions of the gold and soda solutions are added. The fixing solution is obtained by dissolving half an ounce of hyposulphite of soda in 16 ounces of water.

It is very necessary to wash the pictures thoroughly after fixing, if possible by a centrifrugal washing machine, which is decidedly the most effective; if such a machine is not obtainable, the water should fall into the washing trough from a height of at least two feet, in order that it may be set well in motion. The waste-pipe should be situated at two-thirds the distance from the bottom of the trough, in order that a good current may be established. Oblong washing troughs are much preferable to round ones, as the supply and exit pipes may then be placed at a greater distance from each other. If the pictures are not thoroughly washed, the presence of hyposulphite of soda in the prints will soon be made manifest by the formation of spots and the dirty appearance of the pictures.

Treatment of the Prints after Fixing with Direct and Indirect Colours.

This second treatment will yield splendid results in the hands of a skilled painter, but at the same time an operator of ordinary ability may produce some very good effects with it.

After the prints have been well washed and dried, they are ready to be proceeded with. The second process, like the former one, requires to be performed on a perfectly moist print, in order to allow the colours to form a chemical combination with the albumen. They must therefore be thoroughly damped, in the same way as before. All the colours are mixed with gum before application; this prevents them from running over the outlines, and forms, with the albumen, an insoluble compound. One of the great advantages of this method is therefore the fact that the colours are not simply applied to the surface of the picture, but they actually impregnate the albumenous film of the paper. When coloured, the pictures are again fixed in such a manner as to render the pigments perfectly insoluble.

After gum arabic had been fixed upon as the binding material for the colours, it was found necessary to discover some means of rendering it impervious to moisture, as otherwise the colours could easily be dissolved from the picture. After many experiments, it was found that a weak solution of liquor ammonia answered the purpose in every respect, as it did not in any way interfere with the colours, if of the requisite strength. The solution should contain exactly two per cent. of the ammonia, a larger quantity of that substance being found to exert a detrimental effect upon the picture, and a smaller quantity not to produce the required result.

After treatment with this ammonia solution, the colours remain perfectly transparent, and so permanently fixed into the albumenous film that continued immersion in water does not in any way affect them.

(*To be continued.*)

PARIS EXHIBITION, 1867.

The following spaces have been allotted by the Committee appointed for that purpose. There may be modifications afterwards made by the Associate Commissioner. It has been found imperative to grant, in many instances, less space than was applied for, the total space at the disposal of the Committee not exceeding one-fifth of that for which they received applications.

Class 9. Photography.

Spaces placed at the disposal of Committee: floor space, 300 square feet; wall space, 2,000 square feet.

Name of Applicant.	Space allotted.	
	Floor.	Wall.
	sq. ft.	sq. ft.
Bourne and Shepherd		20
Wright, Richard		10
Mason & Co.		15
Heath, Vernon		40
Fry, Samuel		20
Jeffrey, William		20
Foster, Reginald Le Nevo		6
Davies, G. B.		5
Foxlee, Edward W.		20
Blanchard, Valentine		30
Thompson, Stephen		30
Hedderley, James		12
England, William		50
Hooper, late Clarkington		15
Diamond, Dr. H. W.		12
London Stereoscopic Co.		60
Taglis, F.		10
Brown, Joseph		10
De Mezy and Co.		15
Beasley, Frederick, Jun.		12
Wortley, Col. Stuart		40
The Pantascopic Company	20	30
Smith, W. H. and Co.		30
M'Lean, Thomas, and Co.		20
Debenham, William E.		20
Belton, John Charles		20
Faulknor, Robert		15
Elliot, Charles Earp		15
Woodbury, Walter B.		6
Gillard, William		10
Fruwirth, Dr.		30
Dunmore, Edward		20
Cundall and Fleming		12
Beau, Adolpho		15
Ayling, Stephen		15
Haes, Frank		15
Newcombe, Charles T.		15
Bedford, Francis		60
Gordon, Russell M.		24
Williams, Thomas M.		24
Dallas, Duncan C.		12
Swan, Henry		15
Sutton, Edwin	25	15
Moira and Haigh		20
Lock and Whitfield		30
Thompson, C. Thurston		60
Robinson, Henry P.		30
Cherrill, Nelson King		15
Caithness, Earl of		12
Cramb, Brothers		20
Verschoyle, Col. H. W.		20
White, Henry		20
Bird, Peter Hinckes		—
Otley, William H.		6
Mayall, John Edwin		60
Claudet, Antonio		60
Mayer, Brothers		20
Breise, C. S., and Co.	18	—
Godbold, Henry J.		15
Winter and Son		10
Bateson, Robert		15
Pouncey, John		10
Renny, George Stothert		12
Ross, James		15
Robson, Mark		15
Royman, J. C., and Son		16
Tod, Captain A. G.		20
Briggs, Netterville		20

	sq. ft.	sq. ft.
Hemphill, William D....		20
Holroyd, T. and J.		15
Wardley, George		20
Hosmer, Archibald W.		15
Coghill, Sir J. J., Bart.		30
Mudd, James		40
Cameron, Mrs.		30
Jones, J. Clevere		10
Bull, John		15
Wain, Marshall...		9
Hopkins, Robert P.		6
Jeanneret, Francis C.		6
Murrick and Co.		15
Brownrigg, Thomas M.		30
Lovey, Edward...		15
Buxton, Edmund C.		30
Talbot, William F. H....		25
Alfieri, Charles...		15
Mason, William H.		15
Fisk, Alfred Samuel		10
Swan, Joseph Wilson		12
Cruttouden, John		15
Warner, William Harding		20
Wilson, George W.		12
Jones, Baynham		12
Hancock, Charlos		10
United Association of Photography		60
How, James		10
Bullock, Brothers		20
Claudet, Houghton, and Son	8	
Thomas, Richard W.	21	
Murray, Robert, and Co.	10	
Mawson and Swan	20	
Rouch, W. W., and Co.	20	15
Pallick, Meagher	25	
Dallmeyer, John Henry	36	
Ottewill, Collis, and Co.	25	
Ross, Thomas	18	
Hare, Georgo	24	
Austin, William	20	
Grisdale, John E.	6	
Solomon, Joseph	20	

	Floor. sq. ft.	Wall. sq. ft.
Total space demanded	827	7897
„ allotted	316	1967

Signed on behalf of the Council of the Photographic Society,
Henry White,
J. Bell Sedgwick,
Joseph Durham,
Hugh W. Diamond, M.D.,
Secretary.

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THE NEGATIVE.—HOW TO MAKE IT.

BY PROF. TOWLER.*

To many of our readers it may appear ridiculously unnecessary to write an article on the preparation of the negative, with which, from their daily practice, they are supposed to be more conversant than we ourselves; but there is this difference between their practice and ours: their aim in the production of a negative is to get a negative because this will produce a picture, and the picture will produce a dollar: they practice for the dollar. We, on the contrary, by our dabbling in the silver salts, developers, and fixing solutions, are daily aiming to improve the negative out of sheer love for the art, and from a longing after perfection. They are daily becoming richer; we are paying more for our experiments in a week than we gain by the pen as compensation in a month. Besides that, for those who are already perfect in the manipulations of photography, this article is not intended. We are writing for those who are just commencing this beautiful and fascinating art, and we take it for granted they know very little about the subject.

What is a *negative*? You are right: the question is very pertinent. It is the inverse of a *positive*.

What, then, is a *positive*?

It is a picture of an object, in which the lights and shades are precisely in the same place, and, if possible, of the same intensity as in the object itself. Thus, for instance, compare the portrait and the person. Beneath the eyes, the nose, the prominent cheek-bones, the chin, the ears, etc., you see there is more or less of shade, according to the amount of prominence or obstruction to the light. Now regard the portrait: you observe there is the same amount of shade, and it has the same position in the portrait as in the real object of which the portrait is a picture. Such a picture, when produced by the aid of light, and chemical substances, either on glass or paper, is called a positive.

But the negative is a photographic picture, either on glass or paper, in which all the gradations of light and shade, as well as lateral position, are inverted; that is, light becomes shade, shade becomes light, the right side becomes left, and the left side right.

If a glass negative be placed upon a sheet of white paper, the inversion of light, shade, and side can be very distinctly discriminated; the white man becomes black, and the black man white. You will perceive, at the same time, too, that where the white paper beneath is quite visible, the glass in that part is not obscured by any deposit which forms shade and opacity; and, consequently, light can more easily pass through such transparent portions of the glass, whilst through the more opaque parts it passes with difficulty. Thus, if the paper beneath is covered with some chemical solution which is in any way or degree changed when exposed to the sun's rays, it is evident that this change will be in the ratio of the transparency or translucency of the superimposed negative; consequently there will be formed on the paper a picture of the negative picture, only that the lights and shades will exchange places, all beneath the most opaque parts being white, whilst the remaining parts are regular gradations of shade to darkness of the deepest dye where the glass is quite transparent. The picture thus produced would be a positive.

Now knowing what a negative is, and what a positive, we propose to ourselves the pleasant task of teaching you how to make both of these pictures, but not in this article. We will take one at a time.

To prepare a negative, you require glass, collodion, and solution of nitrate of silver, developer, and fixing solutions. Each of these subjects requires a word as we pass along, and admits of subdivisions.

Glass for Negatives.

The glass which is suitable for photographic purposes must be *flat*, *colourless*, *transparent*, *free from flaws*, and as *thin* as the manipulations will permit. It varies in price according to the proportion of the above qualities.

Glass can be obtained of the photographic dealers already cut into the sizes generally required; but it will be found desirable to possess a diamond to make whatever changes in size circumstances may require. Go to a glazier to get instruction how to use a diamond. It is always cheapest in the end to apply to the most perfect artist in order to learn any art. Dabblers and beginners cannot possibly have the knowledge of the proficient; and their teaching, consequently, must be defective. The best painters and statuaries are in Munich, the best musicians in Leipsic, the best opticians in London, the best farmers in Belgium, the best philologists in Heidelberg, the best cooks in Baden, the biggest granite blocks in California, the most unscrupulous politicians in Congress, and more cases of cholera *without pain* in New York than in any other part of the habitable globe. Send your boy then to New York, if you want him to become a proficient in choleratic affections; to Washington, if you desire him to become a filibuster by education; to California, in order to visit Nature's sublimities, which she made during one of her volcanic eruptions when Plato and Neptune were contending hand to hand for her charms. If you want a good dinner, visit Baden during the season, and drop into the Hôtel d'Angleterre, or the Hôtel de Russie, about four o'clock in the afternoon some good Sunday; for the Germans are a wise people, and reserve the best dinners for the days when they have most time and leisure to eat them—"better the day, better the deed." But we are forgetting the negative.

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* *Humphrey's Journal.*

Let us suppose the glass lies before you; it wants cleaning, and the cleaning of glass plates is an *art* also—you have to learn it.

If the plates have never before been used, proceed as follows:—File off all the sharp edges on either side of the plate. Take a triangular file, for instance, and, holding the glass plate in the left hand, lay the flat side of the file on the left corner of one sharp edge, and with one swoop proceed to the right corner of this edge, abrading the sharp edge as you push the file forward and sidewise at the same time. Each edge is treated in the same manner. Throw the plates into a pail of clean water. Wash each one on either side with clean fingers, and use, if necessary, a piece of wet chamois leather dipped in fine rotten stone, in order to remove any little particles or patches of rust or dirt upon the surface of the glass plates which refuse to be removed by simple washing. As soon as a plate has thus been washed, rinse it well in another vessel of clean water, and finally pour over one of its surfaces some of the following solution:—

Solution of Albumen.

White of egg	6 ounces
Water	4 ,,
Ammonia	1 drachm.

Beat the mixture up thoroughly, or shake it up in a large bottle for a quarter of an hour or more, and then put it aside to settle. This is the stock solution, which may be kept for a long time if the bottle be carefully stoppered. For present use, take an ounce of this solution and mix it with five ounces of rain or distilled water; shake up the solution and filter it through a tuft of cotton.

Pour the solution upon the wet plate, beginning at the farthest right-hand corner; let the fluid flow gently to either side and forwards towards the hand until it reaches the right-hand nearest corner. You will soon ascertain how much of the dilute albumen is sufficient to cover each plate, as, for instance, a drachm or two drachms, as the case may be. It is not advisable to pour the excess back again into the vial. If the albumen does not cover all the surface—that is, if it refuses to flow over certain parts—have always ready a glass rod, with which the fluid may be driven over those dry parts. Remove any little particle of dust with the corner of a leaf of paper. Let the albumen flow back, so as to make an even surface, and, as soon as you see that the surface is even and quite free from dust, tilt the plate and let the excess of albumen run off at one corner. Finally, oscillate the plate so as to avoid streaks or reticulations in the albumenous film, and then rear it up on the drying rack in a clean and quiet room, where it is left to dry.

If, however, the glass plates have already been used before, you cannot easily remove the films of albumen, collodion, and varnish by simple washing in cold water; but they may be removed by boiling the plates in hot water. But it is not always convenient to have hot water, and we, therefore, prefer having an acid bath on hand set aside for this purpose, into which the plates are thrown the moment they are no longer required as negatives. This bath is formed in the following manner:—

Chromic Acid Bath.

Sulphuric acid	2 ounces
Bichromate of potassa	2 ,,
Water	32 ,,

The mixture is ready for use the moment the red salt is dissolved; it will keep for a long time, and can be used over and over again until it is quite exhausted. It is well to add some fresh solution to it every week, so as to keep up the strength.

After the plates have been in this solution for a few hours, the films all peel off, or may be made to peel off quite easily; the plates are then allowed to drain, and are then washed at the tap or with a bountiful supply of water from a small pitcher or beaker-glass; and when finally rinsed in clean water, they are ready, as before, to receive the albumen solution. The intention of the albumen film is twofold; it obviates the necessity of bestowing considerably more labour in cleaning the plates, as was formerly the fashion, with rotten-stone, alcohol, collodion, &c.; and, secondly, the albumen film causes the collodion film, which is poured upon it, to adhere with great tenacity. Without this proviso, the collodion film is very apt to split up and slide off from the glass during the subsequent operations of developing and fixing, and especially so with certain specimens of collodion. Glass plates, unless previously thus coated with albumen, however well they may be cleaned, are sometimes sure to produce stains of silver reduction between the film and the glass; but with the albumen film, it may safely be said that such stains never occur. The plates can be albumenized beforehand during bad weather, or in the evening, and may be kept in stock ready for use.

The surface of the glass plate which has thus been coated with albumen can easily be distinguished from the other surface in the following manner:—Breathe upon one of the surfaces; if the breath forms a visible film on this surface, you may conclude that the surface so breathed upon is the plain glass side; for the breath on the albumenized surface does not cause any opacity like that on a plain glass surface.

The next step to be taken is now to prepare the collodion. Photographic collodion is ordinary or plain collodion containing in solution a certain percentage of iodides and bromides. An ounce of collodion contains on an average about six grains of the mixed iodide and bromide, and about six grains of pyroxyline, or soluble gun-cotton. We cannot yet say positively which out of the numerous formulas is the best, because our knowledge of the photographic requirements in collodion, and of its specific action, is still incomplete. This incompleteness in our knowledge is evidenced by the thousands of formulas, all of which work; but which is worst or which best is still a problem to be solved. Arguing as a chemist, we should decide that the proportions of the iodides to the bromides ought to be those of their equivalents, and these proportions we adapt as nearly as possible.

Collodion.

Alcohol, 95 per cent.	16 ounces,
Ether, concentrated	16 ,,
Pyroxyline	3 drachms
Iodide of cadmium	2 ,,
Bromide of ammonium	1 drachm.

Shake the mixture well up in a carefully stoppered bottle, and then put it aside in the cellar to settle and ripen. In twelve hours it may be filtered, or a sufficient quantity of the clear portion may be poured off and used. If the film is too thin, and flows too easily like water, more collodion has to be added: on the contrary, if the collodion dries in ridges after it has been flowed, there is too much pyroxyline; add, therefore, a sufficient quantity of equal portions of ether and alcohol, in order to render it of the proper consistence.

If the film, when it sets, becomes woolly or uneven, it is a sign that either the alcohol or ether is dilute, or both are dilute. To remedy this evil, you must get the most concentrated alcohol and ether, and prepare a fresh stock of collodion, with which a small proportion of the dilute can always be mixed without detriment.

If the collodion film is blue after sensitization, more of the iodide of cadmium and bromide of ammonium has to be added in the ratio of two to one; that is, two grains of iodide of cadmium to one grain of bromide of ammonium. An addition, too, of pyroxyline has always the tendency to render the film more cream-like.

If the collodion film, when dry upon the plate, is opaque or milky, it is a sign that the alcohol and ether are too dilute. Such collodion must be rejected or rectified as above described. On the contrary, if the dry film is as transparent as the glass, this is a condition which will ensure a good picture.

Sometimes the collodion film is very tenacious and contractile, and slips off in one piece from the glass. An addition of alcohol to the collodion will render it more porous and less contractile.

An excess of a cadmium salt, whether an iodide or a bromide, renders the collodion thicker or more glutinous; whereas an excess of an iodide or bromide of ammonium has the opposite tendency, namely, that of rendering the collodion more fluid and thin.

Absolute ether and alcohol are not the best for the preparation of collodion, because they are not good solvents of the iodides and bromides, and invariably give rise to *pinholes* in the collodion film. To remedy this evil, you must add a drop or two of water to the collodion; shake it up, and then set it aside to settle. But you must avoid too much water, otherwise you will precipitate the pyroxyline and coagulate the collodion, which produces the woolly appearance above mentioned.

You must learn these properties by heart, and after a proper diagnosis of the trouble in collodion, you must learn to apply the remedy with knowledge.

AN EXAMINATION

INTO THE CIRCUMSTANCES UNDER WHICH SILVER IS FOUND IN THE WHITES OF ALBUMEN PRINTS.

BY M. CAREY LEA.*

THE last two years have witnessed the most serious assaults that have ever been made upon silver printing, and for a time with every prospect of immediate success. Nevertheless, the old process is just as fixed as ever, and there seems as yet little prospect that any of the novelties so vaunted will secure even a humble share of the work. Not that I have the least disposition to undervalue carbon printing. I earnestly hope to see the day come when it will entirely replace chloride printing. Mr. Swan and Mr. Pouncy have produced some specimens of work of beauty so extraordinary, as, in my opinion, to have surpassed the best silver printing. And some specimens of Mr. Woodbury's relievo printing are extremely good. But something easier, simpler, and more certain will have to be thought out before the old method becomes antiquated. So long as it does not, it will be a matter of unceasing regret that any doubt should exist as to the perfect permanency. To purchase an exquisitely beautiful photograph, and, after a time, to see that fatal yellowness stealing over the high lights, and to know that its final destruction is only a question of time, is a real vexation. Fifteen years ago I purchased, when abroad, a number of Roman photographs, not one of which is now worth the paper on which it is printed; and every one has had similar experience.

It, therefore, is clear that the two directions in which study can be most profitably directed for the advancement of photography, are, in the simplification of carbon printing, and in the determination of all the causes of deterioration to silver prints.

It is a well-known fact, though only lately ascertained, that silver exists in the whites of albumen pictures. I have carefully studied the conditions of its presence, and, without being able to make so satisfactory a report of results as I could wish, I hope to have done something towards extending our knowledge in this direction.

Before proceeding to detail the results of individual experiments, I may mention one general fact. It has been asserted that the existence of silver in the whites was due to the action of faint light, passing through the darkest parts of the negative—light too faint to visibly darken the chloride of silver, and thus impair the whiteness of the high lights. I have disproved this in the following manner: A piece of albumenized paper was sensitized at night, dried, washed, and fixed, without any exposure, under a negative. It was, of course, snow-white. Tested with sulphydrate of ammonia, it gave indications of silver, just as well-marked as other pieces exposed under a negative, and fixed and toned in the usual way. There can exist, therefore, no doubt that the presence of silver in the whites is owing to a combination formed at the time of sensitising, and that it has nothing to do with the exposure.

I have also remarked another fact which has its importance, and which, if not duly borne in mind, may lead to erroneous conclusions. It is, that even dilute sulphydrate of ammonia will make a very evident mark upon albumenised paper which has never been sensitised, and which consequently does not contain a trace of silver. While wet, this mark is yellowish, and so exactly simulates the appearance produced when a faint trace of silver is present, that even a careful observer might be deceived. Even after drying, the mark does not disappear. The yellowish colour of course is gone, but there remains a dead mark that contrasts with the brilliance of the general albumen surface, and this all the more strongly, as the dead mark is surrounded by a bright border, brighter even than the rest of the albumen surface.

When testing, therefore, in this manner, it is necessary to let the mark made by sulphydrate of ammonia become completely dry before judging of it; and also to bear in mind, in the case of very faint marks, that their intensity is increased in appearance by the great alteration of surface caused by the reagent.

I shall next proceed to give the comparative results in the examination of the condition of the whites in a great many different tonings. To make the results fairly comparative, the following method was resorted to. A large negative, highly intensified, so that the high lights were perfectly protected, was printed. A number of different toning baths were prepared, and got into working order together. The print was washed, then cut up, and different pieces were toned in the respective different baths, were fixed with hyposulphite of soda, and, after drying, were tested with hydrosulphate of ammonia. The specimens thus obtained—some as far back as last winter, and others at various times—were carefully indorsed and noted, and are now before me as I write. In all cases when the contrary is not stated, the prints were made on ammonio-nitrate paper.

(1) Toned in the citrate of gold bath. Fixed in hypo.—A camel's-hair pencil or clean pen dipped in dilute sulphydrate of ammonia, and drawn over the whites of this specimen, left a clear buff mark of sulphide of silver.

(2) Toned with benzoate of gold as described by me.—Result the same as the last.

(3) Sulphur toning (trithionate toning), obtained by adding chloride of lead to hyposulphite of soda.—This toning, with or without the addition of gold, is sometimes used still for obtaining intense blacks upon plain paper. It is, of course, not to be recommended, and is included here for greater completeness. Here a larger amount of silver seems to be left in the albumen, for the application of the sulphydrate caused a much deeper mark than in the preceding.

(4) The next trial was made with the well-known old toning and fixing bath of hyposulphite of soda, to which gold has been added. On treating the white with sulphydrate of ammonia, indications of silver were obtained, but much less than in any of the preceding. The streak, in fact, was pale yellow.

(5) The lime toning.—The indications of silver in this case were but moderate.

(6) Alkaline chloride toning gave results not varying materially from the last.

The trials in three of the above tonings were repeated subsequently. The citrate and benzoate of gold gave the same results as above stated. The third was the fixing and toning bath of hypo and gold. In the trial above given, it is mentioned that the mark, in its case, was much paler than in the others. In the repetition, a print was obtained of which the *whites were perfectly free from silver.* After the mark of sulphydrate was dry, it could not be found.

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* *Philadelphia Photographer.*

The foregoing experiments were made with ammonio-nitrate paper. I shall next record the results obtained with *fumed paper*. This was sensitised on a 40-grain bath of nitrate of silver, and fumed five minutes.

(*To be continued.*)

Correspondence.

SPOTS ON ALBUMENIZED PRINTS, PINHOLES.

Dear Sir,—The letter of your correspondent, "P. J. K.," in last week's number, induces me at once to carry out an intention I have for some time entertained to ask your assistance in finding a remedy for certain yellow stains which have troubled me for some time past, and which appear to me to be of the same character as those above mentioned. The first time I noticed this defect was about a year ago—I think in July—and I have several times had to reject as useless thirty out of one hundred prints. I then thought, like your correspondent, that the fault lay in the paper, and I changed the sample for that of another maker, with great benefit to the colour and goodness of the prints, but with no effect as to the evil in question; and subsequent experiments have shown me that five or six or more would be bad out of a sheet, and the rest as good as need be, and these, too, from different parts of the sheet. I therefore dismissed the paper as a cause. I have very carefully noticed all the different stages of the operation, and am not now able to say where the stains are made; and I shall feel greatly obliged to you or any of your numerous readers who can point out a remedy. To make the matter clear, I think I should detail my mode of proceeding, which is this:—I float my paper for two minutes on a bath of 100 grains to the ounce, and drain and dry usually from 120 to 170 cartes for a batch; I print all, and place them from time to time, as done, in a Marion's case. I then float for a few minutes on a shallow bath of water to remove as much as possible of the free nitrate for precipitation and recovery; wash through a tray of water into a tank lined with gutta-percha, where, with frequent changes of water, a number are accumulated, and then, from time to time, removed to another vessel of earthenware, till the whole are washed, when I proceed to tone them, using the carbonate of soda bath, as I detailed to you some two or three years back, washing through till all are toned, and washing again with several changes of water. I then fix in fresh hyposulphite solution at 1 to 6, allowing one ounce of the salt to each sheet of paper. That the evil does not arise in the printing bath I am quite certain, as I perceive it before the prints are put in, and if it is only a slight case, the hypo removes it; that it takes place in one of the two washings, either before or after toning, I feel certain, but I cannot say which, though I incline to the belief that it is in that before. I enclose some specimens, by which you will see, on the backs especially, markings as though one print stained that next to it. I should add that the stains never appear in small batches of prints—say forty to sixty—as in cold weather.

I have to apologise for the length of my letter, but I did not feel I could put the matter fairly before you with less detail to have a due regard to perspicuity.—I am, dear sir, yours very sincerely, Farindon Lane.

Rotherham, August 10th, 1866.

P.S.—I have often noticed the turbidity of the developer on adding methylated spirit, which I only do, when compelled, in the small quantity in the developing glass. I have also noticed flocks of pinholes occurring in large numbers at times, and then ceasing altogether; but I never thought of associating the two as cause and effect, which doubtless they are. I shall certainly avoid methylated spirit for that use in future.

[We shall be glad to receive hints or details of experience on the subject of spots in albumenised prints, which are frequently so perplexing.]

PIN-HOLES IN NEGATIVES.

Dear Sir,—There has been much said in the News about pin-holes, their cause and cure. I beg to contribute my mite of experience.

An old bath, overcharged with iodides and bromides, the developer with methylated spirit, will cause them; but in most cases filtering will cure for a time. Strengthening with a strong solution of iodide of mercury, used over and over, will cause them. This solution should not be returned to the bottle, but thrown away from the plate.

The late Mr. Lacy was very fond of this process, at times using them separate, but when mixed never used twice; and his card pictures are rarely equalled. Sometimes bad glass and water from a heavy pressure will much resemble pin-holes, by washing the collodion from the rough surface.

But photographers should look to their collodion, if used mixed, for the principal enemy; and not mix different makers without some knowledge of their iodizer and bromizer; for example, a bromo-iodized ammonium and cadmium collodion mixed with a *potassium* will throw down crystals of bromide of potassium—so says Mr. Hardwich—which is certain to produce pin-holes all over the plate, and no filtering or doctoring will cure.

Should you think the above worth mentioning, I think many would benefit by the hint.—Yours truly,

Worthing, August 11th, 1866. Harvey Goble.

Talk in the Studio.

British Association at Nottingham.—The exhibition building at Nottingham, in which the conversazioni of the Association will be held, is, we understand, the largest building ever placed at their disposal. The authorities are endeavouring to secure a good display of photographs. We appeal to those of our readers who have specimens ready at this short notice, to assist in securing a good exhibition, by despatching pictures at once, addressed to the Secretaries of the British Association, Exhibition Building, Nottingham. The carriage of packages both ways will be paid at Nottingham. The opening proceedings commence on Tuesday, the 22nd inst., when an address will be delivered by Mr. Grove, Q.C., M.A., F.R.S., &c.

Photography at Osborne.—Mr. Jaboz Hughes was recently commanded to execute various photographs at Osborne for Her Majesty. Amongst other Royal portraits secured, was one of the Royal amateur photographer, the Duke of Edinburgh, better known as Prince Alfred.

The Gordon Dry Process.—Mr. Keene says, in a recent letter on this subject:—"In stating the result of my experience of the "Gordon" process, I hoped to induce others to do so also, that we might have the benefit of ascertaining whether the same results were experienced by others. I like the process exceedingly, and believe it produces negatives not excelled by even the wet, with a regularity and certainty, when temperature is not too high, probably unattained by any other, while the practice of it is free from the complicating washings, &c., which are so tedious and objectionable. Prepared plates by this process approach more nearly in character those by my old four-drachm (as it was termed) Fothergill process than any other, and I should think would do so in composition also, as the limited dilution of the silver solution by washing with only about one drachm of distilled water to every six superficial inches of surface would leave sufficient silver to form in the film an ammoniated compound of nitrate of silver and albumen, not removed, in either case, by subsequent washing. My observations during several years of these Fothergill plates caused me to come to the conclusion, that if prepared at a temperature not exceeding from 60° to 70° Fah., they would keep very well, even through a higher temperature; but prepared at a temperature above that they could not be depended upon."

Royal Cornwall Polytechnic Exhibition.—A correspondent suggests that the Falmouth Committee might communicate great interest to the Exhibition by a display of processes, to be illustrated by a collection of specimens, arranged in some place by themselves, at the forthcoming Falmouth meeting in September: say Swan's process, Pouncy's, Woodbury's, Bullock's, Southwell's, Sir H. James's, Willis's, Osborne's, Fitz Cooke's, and any others that might be available. This would form an interesting and novel feature, and possibly be of service to the inventors and the Exhibition. The Willis aniline process, for the multiplication of maps and plans for highway boards, would be of great service; and as those bodies are having most of the roads mapped in the western district, it is just possible that the patentee of the above process would materially serve his own interests by turning his attention to the hint thrown out.

Woodward's Solar Camera.—Amongst the re-issues of patents mentioned in an American contemporary, we notice the following:—"2,311.—Solar Camera.—David A. Woodward, Baltimore, Md. Patented Feb. 24, 1857: I claim, 1st, Adapting to the camera obscura a lens, or lenses, and reflector, in rear of the object glass, in such manner that it is made to answer the two-fold purpose of a camera obscura and a camera lucida, substantially as and for the purpose specified. 2d, The arrangement and combination of the condensing lens H, or lenses D′ and H, negative slide or holder N, and achromatic lens or lenses E, made adjustable with regard to each other, for condensing the sun's rays upon and through the negative, and focussing them upon prepared paper, canvas, or other suitable material for photographic purposes, substantially as described."

Lord John Russell on Photography.—The Ex-Premier, in a recent address at the annual meeting of the Devon Association for the Advancement of Literature, Science, and Art, made the following observations on photography. The progressive improvements and refinements in the analysis of light since the time of Newton have recently led to an unexpected insight into the material constitution of the sun and the other great light-giving bodies of the universe, viz., the fixed stars. High microscopic power, subtle mechanical adjustments of the prism, and an apparatus for polarisation of luminous rays have, in combination, led to the detection of the characters of substances which in a state of incandescence emit the rays of light. Thus knowledge has been gained into the metallic constitution of the sun, and of some of the brightest of the fixed stars. Our own time has seen some of the most interesting applications of chemistry combined with advanced knowledge of the nature and power of light which it is possible to conceive—I allude to the solar pictures called photographs. Every year sees some new and important improvement in this great discovery. Thus pictures, in which the most delicate details are faithfully preserved, are printed from the electrotype plate obtained from the photograph. The details of the illuminated surface of the moon are obtained with wonderful accuracy, and a photograph of Jupiter has been taken in which the belts of cloud are well marked and the satellites are distinctly shown. Thus Science, on a wing that never tires, has pursued her flight from the days of Galileo to our own time, losing nothing she has acquired, but always adding new realms of knowledge to her former conquests. Returning to photography, it is curious to observe that the photographic eye is more sensitive than the living one; it can receive and register impressions too fine for human vision until increased light and new agency have improved our perceptions. Photography is now an indispensable servant in important meteorological records. Again, the engineer at home can ascertain, by photographs transmitted by successive mails, the progress, brick by brick, plank by plank, nail by nail, of the most complex works on the Indian railways. The physician can register every change of physiognomy in mental malady. The emigrant may carry with him miniatures, such as neither Denner nor Gerard Dow would have equalled in their details, of the persons and scenes with which his dearest memories are entwined. Photography is also important to our social relations, by giving new facilities to the officers of justice for the detection of criminals,"

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To Correspondents.

A. D.—We have repeatedly pointed out the mode of avoiding the red deposit on the shadows, which are apt to occur during the process of developing or intensifying in hot weather. It may arise from various causes, which you will find fully treated in our Year-Book for 1864. It is possible to remove it, when formed, by first treating the plate, after fixation, with a dilute solution of iodine and iodide of potassium, and then with a dilute solution of cyanide of potassium; but the operation requires care, as there is risk of dissolving a portion of the image as well. A simple and safe plan consists in treating the negative with a solution of bichloride of mercury; this turns the red deposit white, so that it scarcely interferes with the printing quality of the negative at all.

G. Williams.—You will find instructions and diagram on p. 74, Vol. V. of the Photographic News. A concave reflector may be used, but is not necessary. Arrange the light and camera as in using the magic lantern.

E. Lewis.—You may neutralize the nitric acid by the addition of oxide of silver, by which nitrate of silver will be formed; or by the addition of carbonate of potash or carbonate of soda, by which nitrates of potash or soda will be formed; after which the bath may be converted into an aceto-nitrate bath for the collodio-albumen process. A bath containing free nitric acid is not well suited to that process.

One.—A good whole-plate lens will answer for the purpose, but the most suitable lens we know for producing beads of two inches long is the new portrait triple of 12 inches focus. 2. Taken with a suitable lens, it will be better to produce them direct.

Dalton.—For a person skilled in such manipulations, it is cheaper to make chloride of gold than to buy it. A 15-grain tube of chloride of gold, if pure, should contain about eight grains of pure gold, worth one shilling and five pence. To make this into chloride of gold, hydrochloric and nitric acids are required, besides labour. From this you may form an estimate of the probable economy of making it for yourself; bearing in mind, however, that unless you are familiar with such operations it is easy to fail, and still more easy to waste much of your material. 2. Standard gold may be used. The chief alloy is silver, which will be left as a chloride, undissolved. 3. It is not necessary to crystallize the gold for your own use; but if you wish to crystallize, it is simply necessary to evaporate at a gentle heat to drive off the acids.

Bandon.—Plain paper salted with a solution containing five grains of chloride of sodium and one grain of gelatine to each ounce, excited on a 30-grain bath, will give good results. 2. Rolling will produce the best surface. 3. Dr. Van Monckhoven's process for development requires practice in order to succeed, we believe. We have seen good results produced by the inventor himself, and we have heard of good results produced after much trying. The simplest plan would be to purchase the nitro-glucose of a manufacturing photographic chemist, ready for use.

A. J. C.—It is probable that your acetate of soda is alkaline, and that it produces alkalinity in the toning bath, in which state it will be inert. The addition of an acid by neutralizing the alkali sets up a toning action. The spots in the print enclosed are due to imperfect fixation, caused by the use of an old or weak bath, or imperfect or too short immersion.

W. Moffat.—The only address we know is that given in the Specification, which is simply "Hastings." We have added this address and forwarded your letter.

Hypo.—The simplest mode of washing prints, so as to secure the elimination of the hypo, is to change them from time to time from the water in which they have been soaking to a vessel of clean water, allowing each print to drain thoroughly before putting it into the water again. A final wash of hot water is beneficial. 2. You have doubtless, by this time, received your allotment of space, and will receive further particulars in due time. 3. M. Lafon de Camarsac's process is a secret: it is not patented.

L. M. T.—The flame of an ordinary gas-jet will enable you to bend a glass rod. Hold the rod in the flame until it begins to bend with its own weight, then gently incline it as you desire. A strip of glass for a dipper may be bent up at the end in a similar manner; but we prefer a shoulder cemented on to a strip by means of marine glue. To effect this, warm the strip of glass and the piece intended to form the shoulder sufficiently to melt the glue when applied, and then press them together with a coating of the glue between. Of course both surfaces should be quite clean.

R. F.—For glass positives, a silver bath containing nitric acid and a freely bromized collodion are necessary. The exposure should be a little shorter than is necessary for a negative, and the development should be stopped at a much earlier stage than is necessary for a negative. There is every reason to believe that a glass positive, well protected from the atmosphere, is permanent.

Juvenis.—The use of glue instead of paste for mounting will, to a great extent, prevent cockling. If you damp the prints and the mounting cards previous to mounting, you may use starch paste without much risk of cockling or warping. We prefer the mounted print to be quite dry, or very nearly so, previous to rolling.

James Date.—The portion of a negative you sent, arrived, smashed to atoms. It is useless to send glass merely packed between pieces of card or millboard. The only safe plan is to use a small box, or an old miniature case. We have a strong objection to the use of dirty glasses, and we prefer to throw old plates away, to accepting the trouble of cleaning them, or the risk of dirty negatives. Mr. Carey Lea's method, with sulphuric acid and bichromate of potash, has been spoken very highly of. The best plan is to clean off imperfect negatives at once, in preference to leaving them for the film and solutions to dry on. Long soaking in water is frequently detrimental, in many cases so affecting the surface of the glass that it is impossible to clean it.

T. S. Pinner.—The silvery deposit or fog on the glass underneath the film is most probably the result of using a damp or imperfectly cleaned plate. 2. Free acid of any kind in collodion is an imperfection; it most probably arises from the presence of acetic ether, which will produce a grey fog and a thin image. 3. The best plan is to throw the collodion containing it away. 4. A trace of iodide in the developer will check fog without seriously interfering with the securing of intensity.

Second Vol.—The circular spot in the card view is a defect to which double lenses are often incident when used for landscape purposes. The best remedy is to use a diaphragm in front of the front lens of the combination. 2. We have never met with such markings in the negatives as those examples of which you forward. From an incidental remark in your letter, it appears probable that you use gelatine in the developer. If this be the case, the markings are undoubtedly due to particles of gelatine deposited on the film and not washed off. The whole of the circumstances you describe would be thus accounted for. The thin particles of gelatine would not be apparent until you varnish the negative, and then the film, being protected in such places from the permeation of the varnish, would dry more opaque than the rest. Wash the film very carefully and somewhat forcibly before drying; or, if necessary, use warm water. The deposit of filaments of gelatine is favoured by the presence of much alcohol in the developer.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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ECONOMY IN SILVER PRINTING.

We recently published a translation of a paper by Dr. Schnauss, containing some suggestions as to economy in the production of albumenized prints. The method proposed, consisted primarily in the use of paper prepared with albumen alone, without the addition of chlorides; and next in the use of a very weak silver bath. As we have, since the appearance of the article, received some enquiries on the method suggested, we propose to make one or two remarks on the subject, in order that experimentalists in the direction may the better understand the materials with which they are working.

In the ordinary albumenized paper printing process the prepared paper presents a surface coated with three distinct salts of silver,—the chloride, the albuminate, and the nitrate. The two first are reduced by light, and form the image; the latter is not reduced by light as nitrate of silver, but, according to the received theory, it is converted into fresh chloride of silver by the chlorine set free in the decomposition of the chloride of silver submitted to the action of light. The two salts of silver which go to form the image have tinctorial qualities very distinct from each other. The albuminate of silver is comparatively insensitive to weak light; but when exposed to direct sunlight, gives a vigorous image of a foxy-brown tint, not readily passing to a deeper colour after very prolonged exposure. The image generally possesses great contrasts, even when a soft negative is employed, tones very slowly, and is comparatively little reduced in the fixing bath. The chloride of silver is on the other hand more sensitive, and especially so to weak radiations; assumes a violet tint under the action of light, passing to a black, and finally to a bronze, under prolonged exposure; yields a soft print, tones easily, and is more reduced in the hyposulphite bath than the albuminate.

The difficulty, as is well known, in plain paper printing, in which chloride of silver was the predominating sensitive salt, was a general lack of vigour; and accordingly it was necessary to add organic substances to the salting bath in order to obtain a sufficiently rich and vigorous print from ordinary negatives. Printing with the albuminate of silver as the only sensitive salt has not been proposed by any one, we believe, before Dr. Schnauss. Nevertheless, it has been tried, but not with sufficient success to justify its recommendation. Some years ago Mr. Jabez Hughes, in the course of some printing experiments, set out with paper prepared with albumen without any addition of a chloride. The paper so prepared was insensitive, and gave hard prints of an unpleasant foxy-brown tint, almost impossible to tone. We have ourselves repeated the same experiment with similar results. An interesting experiment as to the relative sensibility to light possessed by chloride and albuminate of silver, and the colour assumed by each when submitted to strong and weak light which we tried some time ago, gave the following results. A piece of ordinary albumenized paper was sensitized in the usual manner, and exposed under a good negative. One portion was printed by diffused light, another by direct sunlight, and a third portion by means of a lens, by which the direct rays of the sun were brought to a focus, and moved rapidly over the surface to be printed. The portion printed by the latter, which was sufficiently done in about a minute, was an orange tint, apparently consisting almost entirely of reduced albuminate of silver, without any trace of the lavender or violet tint due to the reduction of chloride of silver; the portion printed by exposure to direct sunlight required about five minutes, and was of a rich brown or chocolate tint; the portion printed in diffused light required about forty minutes, and was of a deep purple. The first tint assumed by the portion exposed to direct sunlight was of reddish brown, approximating to the tint produced under the lens, and to the tint yielded by paper prepared with albumen, without added chloride in any light: on continued exposure it gradually assumed more of the purple and less of the orange colour. The portion printed in diffused light assumed first a delicate lavender, like that assumed by chloride of silver alone: it was only after prolonged exposure that the shadows acquired a warmish purple, approaching chocolate, indicating that the albuminate was undergoing reduction, in conjunction with the chloride of silver. After toning and fixing, each portion of the print retained the characteristics assumed in printing. The portion printed by means of the lens retained its foxy hue, when that printed in diffused light had toned to a deep black, and that printed in direct light had assumed a purple brown tint: and these characteristic colours remained after fixing. That printed in diffused light was most changed by the processes of toning and fixing, the lighter tints being most reduced, and the print, notwithstanding that it was soft and delicate, had the greatest amount of relief and contrast, this being due to the more extended scale of tones between deep black and white, than between brown and white. This experiment is chiefly interesting as illustrating the effect of strong and weak light on the chloride and albuminate of silver, but incidentally it illustrates the tinctorial characteristics of each as well.

Other experiments, which we have tried very carefully, and which are confirmed by general experience, show that where vigour is required, the proportion of chloride added to albumen should be comparatively small; but it should not, in our experience, be added in less proportion than three grains to the ounce. With such a paper and a twenty-grain silver bath it is possible to obtain vigorous prints from very feeble negatives. On the contrary, where hard and dense negatives are employed, a much more highly salted paper is necessary. In the years gone by, when dense pyrogallic negatives were used, and these often buried in a thick veil which must be penetrated before the real gradations of the negative were reached, it was customary to use from twelve to twenty grains of chloride with each ounce of albumen solution, and employ a silver bath of from eighty to one hundred grains per ounce. Where very rapid printing is necessary, and especially for weak light, a highly-salted paper and moderately strong bath is desirable. But for ordinary iron negatives, paper prepared with much weaker solutions may be used with equally good results and great gain on the score of economy. As a rule, we have found, as we have before had occasion to state, that the silver bath should contain about five times as many grains of nitrate of silver per ounce as the albumen solution contains of chloride, supposing sodium or ammonium to be the base employed. Where it is desired to obtain vigour from weak negatives, a small proportion of chloride in relation to the albuminate and free nitrate is desirable; and where it is desired to obtain softness from hard negatives, a larger proportion of chloride in relation to albuminate and free nitrate will best attain the end. The use of nitrates of potash, soda, &c., in the printing-bath was first proposed in our pages about three years ago, and met with much discussion and some derision. Dr. Schnauss, in his paper, unhesitatingly states his conviction that a great gain in economy is secured by the addition of such nitrates.

Whilst writing on the subject of economy in printing, we may mention a plan we recently saw practised in the establishment of Mr. Hughes, at Ryde, and which is also employed by Mr. England. The expedient is one attended with convenience and economy, and also obviates a difficulty of which we have recently heard several complaints, namely, the irregular draining and drying of the paper after sensitizing; instead of the drainings subsiding evenly, drops of the silver solution remain at various points on the surface of the paper, and these inevitably cause stains in the print. In the establishments we have named, the paper, after sensitizing, instead of being hung up to drain and dry, is placed between large clean sheets of white blotting-paper, to remove the superfluous solution. It is then hung up to dry, and is ready for the printing-frame in a few minutes. The gain in consequence is obvious, and there is no loss of any kind in the quality of the print.

PHOTOGRAPHY AS A FINE ART.

The old controversy on the art-capacity of photography crops out at frequent intervals in various places. An able scientific contemporary, the *Intellectual Observer*, has an article on the subject, in which there is less declamation and more reasoning than we have often found in articles questioning the claims of photography. We quote some extracts, without entering into discussion of the subject, beyond stating, in the first place, that the incomplete or partial stating of some of the truths set forth, conveys, in our estimation, a false impression; and in the second, that in referring to the defects of photographs, the author does not seem familiar with the amount of success with which the most capable photographers have combated many of the evils to which he refers.

Those who considered that the function of the artist was merely to copy natural objects with accuracy and fidelity, were (though erroneously) prepared to be satisfied with the operations of photography as soon as they were conducted with a sufficient amount of technical skill. There are certain cases in which art realizes all the conditions of deceptive imitation, and it is not very difficult to paint a butterfly, or a deal shaving, so that a spectator might actually expect to be able to catch the pretended insect, or pick up the thin curly slice of wood.

When this mechanical fidelity is realized, there are many persons who conceive that nothing more is to be desired, and they form in their own minds a rude and inaccurate mode of estimating pictures according to the amount of realism which they exhibit.

A little more acquaintance with the facts of nature and the possibilities of art soon lead to the conclusion that realistic imitation is only possible to a very limited extent, and that in the main what may be called the imitative part of the artist's work consists in transposing, according to natural laws, the facts of nature into the technical language of art. The painter can make no real imitation of the light which streams from the sun or the artificial fire, and his scale of light, shade, and colour is not only much lower, but in many respects different from that of nature. Only to a slight extent and under favourable circumstances can he, with any success, make the slightest attempt to imitate the strength of white light as seen in nature, and the art of the colourist is shown in his power of *transposing* what nature has composed in keys of actual light into corresponding, but not resembling, keys, such as his pigments enable him to provide.

The eye, as a living organism, does not remain in one and the same condition during any considerable portion of time in which an object is contemplated. Thus, if an object consists of parts in different planes, rapid focussing changes will occur in the eye, and the impression of vision is not the simple result of any one of these focussings, but a sort of average resulting from all. The perception of colour is not a simple affair. According to original sensitiveness and cultivation, the sensation of a colour is followed by another sensation of its complementary hue, and when two or more colours are simultaneously presented to the eye, very slight differences in the direction of that organ, and in the attention which the mind pays to its indications, determine the precise result that is produced. The brightness of natural objects seen in full lights not being imitable by the artist, it follows that his productions cannot have the same power of summoning up complementary tints. Again, natural objects are more or less in motion, and more or less affected by motions of light and shade upon them, and the artist has to select and stereotype one out of many successive appearances presented to his view.

A few considerations of this kind will show how soon the limits of realistic imitation are reached, and it must also be remembered that even if accurate imitation were possible, it would not satisfy the human mind, which demands imagination, sentiment, emotion, as well as beauty in works of art. But it is generally supposed that photography comes to us with something like a perfection of imitative capacity. This is not the case. Instead of photography being necessarily right, imitatively considered, it is necessarily wrong. In the first place its focussing is a compromise, and if we take one of the best specimens of photographic landscape, its treatment of foreground, middle distance, background, and greater distance, will never be found conformable either to nature, or to the impressions which, through the eye, the scene depicted makes upon the mind. In nature, yellow light is the next in point of brightness to white light. Photographic machinery turns it into black. The natural scale of brightness as connected with colour is constantly at war with the photographic scale; and the results of this conflict are seen in all photographic works which attempt to give a black and white version of a polychromatic object or scene.

The rise amongst us of the pre-Raphaelite school, and the modifications which that school, as represented by its leading artists, has undergone, has familiarized most minds with questions pertaining to detail or generalization. To paint a number of leaves and branches correctly, according to imitative notions, is not to paint a tree as any mortal ever saw it or could see it, when he looked at it as a whole. Too much detail for the conditions of a picture damage its verisimilitude as well as its art. Too vague a generalization is still more fatal, because it is wanting in particular truth. A drawing of a particular man so generalized as to be as much like any other man of the same race and clothing, would be an absurdity if it could be produced, and the true artist has to consider how far he is to generalize, and how far he must particularize, in order to produce the best result—one of truth combined with beauty and with suggestive power.

If a number of good and bad photographs are examined, it will soon be found that, in addition to their merits or demerits, as attempts at imitation, they will vary in approaching to or receding from the kind of delineation which great artists delight to give. The artist imitates the appearance of nature in which delicately graduated lights and shades indicate the forms of objects seen in and surrounded by an atmosphere. Photography has a constant tendency to the child's blunder of making hard firm outlines where nature avoids them. The best of the orthodox school of photographers mitigate this mischief, but we are not aware that any one besides Mrs. Cameron has fairly attacked and vanquished it, and thus established a connecting link far stronger than any which previously existed between photography and fine arts. Mrs. Cameron has been engaged for several years in this labour, and her productions have been for some time before the public; but some of her most recent works have been the most remarkable, and have called forth from artists of the highest eminence a very enthusiastic, and, as we think, richly-deserved praise. Mrs. Cameron has especially devoted her talents to two objects, both usually neglected in photography. The first is the realization of a method of focussing by which the delineations of the camera are made to correspond with the method of drawing employed by the great Italian artists. The second has been the introduction of an ideal pictorial element, by selecting good models and calling forth the kind of expression which a judicious artist would desire to enshrine in his work.

It is unnecessary to pursue further the remarks on Mrs. Cameron's pictures, nor to qualify them by adding our own opinions on that point, as these have already been recorded.

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PHOTOGRAPHIC PRINTING BY THE SHELLAC PROCESS.

BY ARTHUR TAYLOR.*

A SUMMARY description of the process of printing with shellac was lately communicated to the Society. The object of the following is to give some account of the formulæ and manipulations to be used. It should be stated, however, that this method of printing having as yet been but very imperfectly investigated, these formulæ are not given as being the best possible, but merely as those which have given the best results, and to serve as starting points for other experimenters.

The materials to be used for the coating solutions, are: bleached shellac, borax, and ordinary phosphate of soda.

Solution with Borax.

Water	100	parts by weight
Borax	4	,, ,,
Shellac	8	,, ,,

Solution with Phosphate of Soda.

Water	100	parts by weight
Phosphate of soda ...	4	,, ,,
Shellac	5	,, ,,

To prepare either of these solutions, the proper quantity of finely pulverized shellac is put into a bottle, shaken with water, to wash out the soluble salts which may remain from the bleaching process, and thrown on a filter to drain.

The water, contained in a suitable vessel (*e.g.*, an enamelled iron pot), is placed on the fire, the borax or phosphate dissolved in it, and the shellac added in a damp state. Care must be taken that the water is not too hot when the shellac is put in, or this last will stick together in lumps, which will dissolve with great difficulty. The liquid must be kept gently boiling for about two hours, stirring from time to time. More water must be added to replace that wasted by evaporation.

As the resin is in excess, all will not be dissolved. Moreover, shellac is not entirely soluble in these saline solutions, and the insoluble portion remains as a grey slimy matter, which chokes the filters very rapidly. The liquid obtained must therefore be allowed to settle for about twelve hours, carefully decanted, and filtered, first through the sponge, and then through paper. The filtration is exceedingly tedious, and the filters must be changed frequently. The filtrate is always slightly turbid or opalescent.

These shellac solutions will keep many months, camphor being put in the bottles to prevent mouldiness. They may be used separately or mixed, according to the colour required, or the nature of the negative to be printed, as is explained in the former paper above referred to. A mixture of five parts of the borax solution and one of that made with phosphate of soda gives good results with negatives of mean intensity. It is probable, that instead of mixing the solutions of shellac, the same end would be gained by simply dissolving the proper proportion of phosphate of soda in the solution made with borax.

Either ordinary photographic papers or drawing paper may be used. The following remarks apply more especially to Whatman's drawing paper.

The paper should be cut one or two inches longer than the prints to be made, and the extra length doubled over towards the side which is to receive the image. It serves as a handle in the subsequent operations. The sheet to be coated should be plunged into the bath endwise, so as to flood it at once, a glass triangle being used to ensure this. The right side of the paper—that which is to receive the image—is to be uppermost in the bath, and the glass triangle passed over every part of it slowly and lightly. After an immersion of about a quarter of a minute, the paper is to be drawn out and hung up to dry.

For rendering the paper sensitive, a bath containing fifteen per cent. of nitrate of silver has generally been used, but a weaker bath might answer the purpose equally well. This bath should be filtered each time it is used. A slip should be cut off the paper to remove any hardened drops of shellac which may have formed at its lower part during the drying. The sheets may be floated on the nitrate of silver bath from three to five minutes.

Although, in some cases, it is advantageous to use the paper in this state of preparation, it will generally be best to let it undergo another operation before printing. This consists in plunging the sheet once more, either in the coating bath first used, or in a similar bath diluted with half its bulk of water; the operation is to be conducted exactly in the same way as for the application of the first coating. The paper thus prepared will be found to keep fit for use a long time; this is probably due to the fact that it no longer contains any nitrate of silver.

The common phosphate of soda is a tribasic salt; and one equivalent of the base being water, the reaction with nitrate of silver may be expressed as follows:—

$$2\,\mathrm{Na, O, HO, PhO_5} + 3\,(\mathrm{Ag\,O, NO_5}) = 3\,\mathrm{Ag\,O, Ph\,O_5} + 2\,(\mathrm{Na\,O, NO_5}) + \mathrm{HO, NO_5}.$$

One equivalent of nitric acid is therefore liberated. This last circumstance is probably the reason why a portion of the gelatine in the paper becomes soluble, and is removed in the fixing process, and in the final washing when phosphate of soda has been used in the preparation.

It might be supposed that the nitric acid thus set free would accumulate in the sensitizing bath; but this has not been observed to be the case in practice, for the bath does not contract any excessive acidity, even after prolonged use.

Prints on paper that has received but one coating of shellac should be thoroughly washed before fixing; those, on the contrary, on paper that has received a second coating must be fixed without any previous washing.

Prints on paper prepared with phosphate of soda alone, or with a large proportion of this salt, take a good tone when simply fixed with hyposulphite of soda. But when the shellac solution has been prepared with either borax alone or borax with a small proportion of phosphate of soda, the best tones are obtained by the use of sulphocyanide of ammonium in conjunction with hyposulphite of soda: these salts may either be mixed in the same bath, or the prints passed first through a solution of the sulphocyanide, and the fixing terminated with hyposulphite of soda alone. The prints should remain in the sulphocyanide till they have acquired a decided yellow colour, which will take place after an immersion of about two minutes; they must then be passed directly into the final fixing bath of hyposulphite,

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[*] We have been favoured by Mr. Taylor with the English version of the following paper, read before the Photographic Society of Marseilles. The paper as published in our columns contains some additional remarks not read at the Society.

in which they should remain from twenty to thirty minutes, and be repeatedly and carefully turned over separately.

The fixing solutions may be composed as follows:—

Hyposulphite and Sulphocyanide mixed.

Hyposulphite of soda ...	15	parts by weight
Sulphocyanide of ammonium	5	,, ,,
Water	100	,, ,,

Sulphocyanide alone.

Sulphocyanide of ammonium	8	,, ,,
Water...	100	,, ,,

Hyposulphite alone.

Hyposulphite of soda ...	15	,, ,,
Water	100	,, ,,

After the washing, which must be very thoroughly and carefully executed, the dried prints may be considered as being finished. In most cases, however—and especially when phosphate of soda has been used—the appearance and permanency of the prints may be enhanced by saturating them with a varnish composed of—

Bleached shellac	30 to 40 grains
Alcohol	1 fluid ounce.

Dissolve by agitation in a bottle, and use the clean liquid obtained by filtering or decantation. This should be flooded over the *back* of the print with a brush, so as to penetrate the whole thickness of the paper, and come out on the face, to which, when dry, it should give but a very slight gloss.

The varnish has not been used for prints on thin paper; these last may be finished by callendering as usual.

Marseilles, August 14th, 1866.

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THE SOLUBILITY OF IODIDES IN ALCOHOL.

BY DR. VOGEL.

I have recently tested the solubility of various iodizing salts in alcohol. It is very curious that this important point has hitherto received but little attention. Hardwich, it is true, did recommend the more soluble iodide of sodium, instead of the iodide of potassium (which is very sparingly soluble in alcohol). He says:—"One ounce of collodion (containing equal parts of alcohol and ether) dissolves four grains of iodide of potassium, and only one-fourth of a grain of bromide of potassium." Therefore, it very often happens that precipitation of the scarcely-soluble bromide of potassium arises from using iodide of potassium with a solution of any other soluble bromide. For this reason I do not recommend the application of potassium salts in the collodion (though they are the purest in the trade). A short time ago I very often used the iodide and bromide of sodium for my collodion. I examined its solubility in alcohol: 100 parts alcohol, of 95 per cent. at 15° Celsius, dissolved 8·33 parts of iodide of sodium. The solubility of the pure bromide of sodium I have not examined; but I determined its solubility in the presence of cadmium salts (iodide and bromide of cadmium). I give you herewith the degrees of its solubility:—

30 parts of alcohol containing	Dissolved
0·7 Na I and 0·7 Cd I	0·233 Na Br
0·4 ,, ,, 1·0 ,,	0·317 ,,
1·5 ,,	0·4 ,,

The solubility of the bromide of sodium therefore increases with the quantity of present cadmium salts. [This table is copied from the *Mittheilungen*, in some French periodical, but with important errors in the numbers.]

Finally, I examined the solubility of bromide of ammonium (95 per cent.): 100 parts of alcohol dissolved three parts of bromide of ammonium. Therefore the bromide of ammonium is the most soluble bromide after the very easy soluble bromide of cadmium. I recommend this salt (NH_4Br) as one of the most useful sensitizers; it is very durable, sufficiently soluble, neutral, and of excellent purity in commerce. The salts of sodium would be also very excellent iodizers, but they are very seldom pure in commerce; they contain often carbonate and sulphate of sodium, and perhaps also bromate ($NaO\ BrO_5$), which is decomposed with the iodide in the collodion, and induce a liberation of iodine analogous to the formula:—

$$5\,HI + BrO_5 = 5\,HO + Br + 5\,I.$$

M. Carey Lea published an interesting paper in the *Philadelphia Photographer*, wherein he shows that the defects which too much bromide in collodion produces exactly resemble those which result from too much iodide. In connection with this experiment, I hope it will be interesting to remark some facts observed shortly by myself.

I formerly pointed out, that if a small quantity of bromide is added to a merely iodized collodion, the film loses its sensibility for strong light precisely as it gains in susceptibility to the action of weaker rays. I had proved this point by taking a plaster bust partially covered with a black drapery. With an iodized collodion I obtained a negative with highly intense lights, but without details in the dark drapery, whilst the bromo-iodized collodion gave the lights much less intense, but much more detail in the black drapery. Also, the outlines of the negative given by the iodide alone were not clear, but vanishing. I now examined the action of a pure bromide and of a pure chloride collodion. Three collodions were prepared, the first with iodide of cadmium, the other with an equivalent portion of bromide of cadmium; the third with an equivalent portion of chloride of cadmium. With these three samples I took a plaster bust with black drapery, under the same circumstances. The iodide collodion gave a very intense and hard negative with little details in the black drapery, the outlines vanishing. The bromide collodion gave not the least trace of the black drapery, and a clear but weak image of the white plaster; the chloride collodion did not give any trace of a picture (under the same circumstances), exposure one minute.

We observe, in these facts, that the action of a mixture of iodide and bromides is not to be explained by the action of its constituents alone. Mr. Lea's and my own experiences only show that a bromo-iodized collodion wherein the the iodide greatly exceeds nearly resembles in its actions to the pure iodide collodion; and that a collodion wherein the bromide is predominant has almost the same action as a pure bromide collodion.

It is interesting here to see the fact, newly proved by experiments, that an addition of chloride to a pure iodide collodion acts in exactly the same manner as an addition of bromide. It imparts to the iodide collodion softness and clearness of the lines. But in this experiment the condition of the nitrate bath is of great influence. The action of bromide collodion above mentioned is quite different, if the bath is not pure, but contains iodide of silver. I sensitized a bromide collodion film in an ordinary old nitrate bath containing iodide. The sensitized film appeared of a greenish tint, very different from a bromide film sensitized in a pure nitrate bath, which was of a blue colour, and more transparent. I exposed these two plates one minute on a plaster bust with black draperies, and developed with sulphate of iron. The film, sensitized in the ordinary bath (containing iodide), gave a well-exposed soft image, with much detail in the black drapery. The other film, sensitized in the pure bath, gave an image as above mentioned, only the white plaster bust, and not a trace of the black cloth.

The reason of this behaviour I have already explained, two years ago (Photographic News, 1864, p. 352). A little quantity of iodide contained in the bath is precipitated in the collodion film. A prepared plate being brought into the silver bath, a great part of the latter enters into the porous film, and gives up its silver, by forming bromide of silver with the salts of collodion. But the nitrate solution is thus weakened, and thereby it loses the capacity of dissolving the iodide of silver, which will, therefore, be precipitated on the film. If the bath is fresh and contains only a little iodide, the precipitated iodide on the film will be dissolved again on moving the plate in the bath; but if the bath is old and nearly saturated with iodide of silver, it will not dissolve the latter, which then will remain on the plate.

ACTION OF LIGHT ON GLASS.

BY DR. VOGEL.

In your last number I find a very interesting editorial article on the action of sunlight on glass. Allow me to mention, in connection with this, a very curious fact, which was reported by the eminent Professor of Physic and Meteorology, Mr. Dove, ten years ago.

The owner of a manufactory of mirrors exhibited a fine one in his shop window, across the face of which the name of the firm was mounted in brass letters. The business was subsequently given up, but this mirror was retained by the maker for his private use, and he removed the brass letters and cleaned the surface. But it was found that this treatment was not sufficient to obliterate the name of the firm, and that even (on the assumption that the action was superficial) when the surface of the glass was ground off and re-polished, it was still impossible to obliterate the letters, which remained visible on the glass. The explanation of this fact is probably to be found in the change of colour which the unprotected portions of the glass suffered during a long exposure. Another very interesting fact was told me by my friend Stosch, the able operator of the Haufstaengel Atelier, in Dresden. He had in his possession two pairs of Voigtlander's stereoscopic lens, of exactly the same actinic power; one of these lenses he used often for enlargements, and he was very much surprised to observe, after some months, that the actinic power of this lens was diminished in a remarkable degree, in comparison with the other lens of the pair.

"PROCESS-MONGERING."

Our American contemporaries have frequently had occasion to point out the folly of paying sums for secret formulæ hawked about by what they term process-mongers. From the following letter, just received, it appears the practice is obtaining in this country:—

"Sir,—The other day a man called upon me, wishing to sell me a process which he set forth possessed the following advantages,—economy in the negative bath, with vastly increased sensitiveness; two-thirds of the time occupied in producing pictures by any other process being quite sufficient (by his) to produce pictures of a quality for richness of detail and brilliancy never before equalled. He showed me a great number of testimonials and letters of introduction, bearing the names of many of the leading photographers of London and other places. His terms were three guineas. I was unwilling to purchase. He ultimately offered me the process for thirty shillings, and the enclosed is what I got for my money; which, if you will be good enough to publish for the benefit of my brother photographers, they will be able to judge its worth, and your humble servant will be greatly obliged.

Negative Silver Bath.

First Bottle.

Nitrate of silver	1 ounce
Water	12 ounces
Nitric acid	2 drops.

Second Bottle.

Nitrate of silver	1 ounce
Water	12 ounces
Acetate of lead	3 grains.

Dissolve each solution well, and mix the second into the first, and shake well. Now dissolve 2 grains of iodide of potassium and 1 grain of iodide of cadmium in 4 ounces of water, and mix into other bath, shake very well and filter, and the bath is ready.

Developer.

Amm. sulph. of iron	3 drachms
Sulphate of copper	25 grains
Water	5 ounces
Formic acid	3 drachms
Glacial acetic acid	1 drachm.

Silver Bath for any Kind of Paper.

Nitrate of silver	1 ounce
Nitrate of potass	2 ounces
Water	20 ,,

Float five minutes.

Toning Bath.

Chloride of lime	90 grains
Carbonate of lime	½ ounce
Acetate of soda	½ ,,
Water	6¼ ounces.

Stock Bottle.

Second Bath.

Taken from the stock-bottle, with the deposit	115 grains
Water	15½ ounces
Gold	8 grains.

This bath must be mixed eight or ten hours before using and not filtered.

For Cleaning the Hands from Silver.

Glauber's salt	5 ounces
Chloride of lime	5 ,,
Hot water	20 ,,

Another Toning Bath.

Carbonate of lime	120 grains
Chloride of calcium	20 ,,
Gold	4 ,,
Water	20 ounces.

Not filtered.

Any photographer may see how new the above is!

J. M.

Recent Patents.

ALBUMENIZED PRINTS NOT REQUIRING TONING.

The following specification, which received provisional protection only, is for a method of preparing albumenized paper, which shall give black tones without the use of a toning bath, the colour being dependent, apparently, on the presence of phosphate of silver:—

These improvements in the manufacture of photographic papers have for their object more particularly to simplify the operations relative to the obtaining of positive proofs, and also to effect considerable economy in the cost of producing such proofs by dispensing with the use of the chloride of gold or platinum usually employed in the developing process. For this purpose a small quantity of hypophosphorous acid, phosphorous acid, phosphoric acid, or any salt having such an acid for its base —such as phosphate or phosphite of soda, potash, or ammonia— is to be mixed with the albumen prepared for covering the surface of the paper. The proportion of acid or salt employed in relation to the albumen may vary from 2 to 20 per cent.

In order to effect an intimate mixture, the albumen and salt or acid are beaten up together and left to settle for about twenty-four hours before being used. In order to render the paper sensitive, it is sufficient to lay it upon a solution of nitrate of silver; this paper will require precisely the same exposure as ordinary albumenized paper. The proofs will take different shades of brown, according to the length of time they are in the press. After two or three successive washings in distilled or rain-water, the proof (without undergoing the changing or developing process) is submitted for from fifteen to twenty minutes in the dark to a bath of hyposulphite of soda, containing, if desired, a small quantity of chloride of silver, in order to remove all the phosphate of silver and leave the lights white; the proof is then to be exposed to light for several hours while immersed in the hyposulphite bath, and then washed. Dark shades will thus be produced which nearly resemble those produced by printing from copper-plate engravings.

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AN EXAMINATION

Into the Circumstances under which Silver is found in the Whites of Albumen Prints.

BY M. CAREY LEA.[*]

FUMED PAPER.

Fixed with Hyposulphite of Soda.

In the following trials the paper was sensitised upon a 40-grain acidulated bath, and was then fumed five minutes with ammonia.

(7) Lime toning.—Hydrosulphate of ammonia applied to the whites gave an indication slightly less than the average.

(8) Benzoate of gold toning.—About the same as the last.

(9) Citrate of gold toning.—About the same, or a little more indication of silver.

(10) A portion of the same print was toned in a bath prepared as follows:—Two ounces of hyposulphite of soda were dissolved in eight ounces of hot water, and chloride of gold corresponding to one grain metallic gold was added while hot. The bath was used two or three hours after mixing. This bath toned to a rich purple black. Marks made on the whites with hydrosulphate of ammonia could not be found after drying, thus indicating a complete absence of silver.

Sulphocyanide Fixing.

A print was made on paper sensitized on a 40-grain acidulated bath, fumed ten minutes with ammonia, and printed under a strong negative. It was then cut up.

(11) A portion was toned with alkaline chloride, and fixed with hyposulphite for a comparison. It gave, with sulphydrate of ammonia, results similar to those already noted.

(12) Toned in the same way, and fixed with sulphocyanide of potassium.[†]—Result, with sulphydrate of ammonia, about the same as the foregoing.

(13) Toned and fixed in a bath of sulphocyanide of potassium and choloride of gold.—Result as before. A camel's-hair pencil dipped in dilute sulphydrate of ammonia, and drawn across the whites, leaves a well-marked pale buff streak.

(14) Toned and fixed in a bath of sulphocyanide of potassium and fulminating gold.—Result the same. (In fixing with sulphocyanide, it appears more difficult to keep the whites clean than with hyposulphite.)

Fixing and Toning Bath.

(15 and 16) Two further trials were made with the fixing and toning bath of hyposulphite and gold. In these the same bath as before was used, now four and five days old respectively. The results were the same. Whilst in every other case the marks produced by the sulphydrate were clear and well marked, in these last, as well as in (4) and (10), the marks were either invisible, or could only be found by close and attentive inspection. This result was to me altogether unexpected. The fixing and toning bath has been so loudly accused of all sorts of mischief, especially of being "wrong in principle" (which it certainly is not), that I was extremely surprised to find it possess this very striking superiority in so important a point.

I did not, however, rest contented even with these repeated trials. Having printed a number of prints from various negatives, I toned some of them in the ordinary methods, and fixed and toned some with the hyposulphite and gold. I then applied the sulphydrate to the high lights, and found that in all cases the same superiority existed. In fact, all the prints which had been so toned and fixed could be picked out by mere inspection of the sulphydrate mark.[*]

I am, therefore, prepared to state, as a fact that does not admit of a doubt, that a print fixed and toned with hypo and gold contains less silver in the whites than when treated in any other of the methods which I have described. My remarks must be understood as applying to a bath properly managed. If the same bath is used until, by the action of the chloride of silver upon the hyposulphite, a quantity of tetrathionate of soda is formed, the results as respects the silver in the whites may be different. That is a point which I have not cared to examine; it would have no real value, whatever the result might be, as the use of such a decomposed bath is to be condemned on other grounds.

I am aware that the ground which I have taken here—namely, that a fixing and toning bath gives the purest whites, chemically speaking—will be apt to arouse much opposition. To such as may call my results in question, I say, prepare the bath as directed at (10), and observe the results. These are matters that must be judged by experience, not by theory. Nor is it to be supposed that I have been influenced in my conclusions by a prejudice in favour of this method. On the contrary, my prejudices were the other way. I had read such bitter attacks upon this mode of proceeding, that, except while making these experiments, I have never used it, but have toned and fixed separately.

I now come to another part of the same subject; a part in which I regret that I have not been able to arrive at any positive conclusions as satisfactory as I could wish. I think, however, my results will be worth stating briefly, both because I may save others the trouble of making similar investigations, and because, by illustrating the extraordinary tenacity with which the silver remains combined with the albumen, they give greater completeness to an examination which has required no small expenditure of time and attention.

The existence of silver in the highest lights, the purest whites of the finished picture, cannot be looked upon otherwise than as a very great evil. So long as it is there, there are far fewer chances for the permanence of the print; and if any way could be found for removing it, without injury to the rest of the picture, it would be a great advantage. This is a very difficult problem, and one which I have been as yet unable to solve. It was at one time asserted that fixing by sulphocyanide of ammonium removed this portion of the silver; but this again was contradicted and, as we have seen, very properly. Indeed, if there exists any preference in this respect, it is in favour of the hyposulphite. But the difference is too inconsiderable to be worthy of attention.

There is another important point to be borne in mind, which follows directly from the examinations here recorded, and which has not before been adverted to. As the silver in the whites is not there by any action of light, but simply in combination with the albumen, this peculiar combination of silver and albumen is necessarily present in every part of the picture. It is not more present in the high lights than in the deep shadows, though its presence can only be made evident to the eyes in the former. The silver is present in an entirely different form from the reduced silver which constitutes the body of the picture until it is toned; it is liable to be differently affected by all external circumstances, and undoubtedly forms an element of weakness in the finished print.

The fact that silver is present, not by any influence of light, but simply in combination with the albumen, seemed to establish a possibility that some means might be found of dissolving it out. It seemed possible that some reagent could be found, which would either dissolve out this silver, or bring it into a condition of solubility in hyposulphite. Could such a reagent be found, it might either, according to its nature, be placed in the gold toning bath, if capable of such application without injury to the bath, or the prints might be passed through the solution immediately after their first washing. The following substances were examined :—

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[*] Continued from p. 395.

[†] The ammonium salt at the time when these trials were made was not to be had here. I therefore employed sulphocyanide of potassium of my own preparation, and perfectly pure.

[*] Quite recently I have repeated these experiments with a similar result.

Ferrocyanide of potassium.
Ferridcyanide of potassium.
Iodide of potassium.
Bromide of potassium.
Chloride of ammonium.
Acetate of soda.
Phosphate of soda.

The papers, after being cleared of free nitrate of silver by washing, were placed in solutions of these respective substances for about ten minutes. They were then placed in a very strong solution of hyposulphite for a quarter of an hour, and then thoroughly washed. On testing them with sulphydrate of ammonia, together with a portion of the same prints treated in the ordinary way, on comparison no difference could be found, except that the paper treated with iodide of potassium gave a darker shade than any of the rest. In fact, iodide of silver dissolves in hyposulphite of soda much more slowly than chloride or bromide. A piece of paper prepared with iodide of silver retained its yellow colour almost unimpaired after fifteen minutes' exposure to a strong hyposulphite bath ; some even remained at the end of half an hour. After eighty-five minutes the silver was perfectly gone, but sulphydrate of ammonia still produced the buff streak.

It follows, therefore, that no substance (as far as these experiments go), is capable of dissolving out the silver from the albumen.

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WASHING AND FIXING PRINTS.

BY LEIGHTON PINE.*

Venturing to enter the gallery of one of our city photographers a few days since, we found him in no enviable state of mind, in consequence of—to use his own expression —"having a world of trouble with the water." A few questions elicited the fact that his water-tank had treated the occupants of the lower portion of the building to a small flood, in the shape of several barrelsful of water, thereby injuring the goods, wares, and merchandise of the aforesaid occupants, damaging somewhat the reputation of our friend, the artist (several parties having unanimously voted him to be a nuisance), and reducing very materially the contents of his wallet. "Troubles never come singly," is a saying no less old than true, and the present case is no exception to the rule ; for, in consequence of the flood, our friend is not allowed to leave the water running at night, as he has to resort to all kinds of dodges to wash his prints ; but notwithstanding the utmost care on his part, the prints seem to fade—and why ? For the simple reason that he did not understand the principles of fixing and washing photographic prints.

Notwithstanding all that has been written on the instability of photographs, and the causes thereof, there are still "a few more left," who seem to be in darkness on this all-important subject ; and in order to help those who wish to make *permanent* photographs, we propose to divide into four parts the causes of their fading, and how to prevent the same.

1. *Acid Hyposulphite of Soda.*

Not one sample in ten of this article, as sold by stock dealers, is sufficiently free from acid to be used in fixing prints. The least trace of acid in the fixing bath is fatal to the stability of the prints. In order to neutralise it, take the usual quantity of hyposulphite of soda used in the bath, and add to it sufficient water to make a saturated solution ; then test for five minutes with litmus paper, and if, at the expiration of that time, the paper indicates the presence of acid, add bicarbonate of soda until the colour is restored to the paper, and then dilute with water to the usual strength. If the bath be used more than once, add a few grains of bicarbonate of soda each time before using.

2. *Insufficient Fixing.*

Many operators are in the habit of leaving the prints in the fixing bath a certain length of time, and after placing them in the solution, never touch them again until the time comes for taking them out. Now, in order to fix prints properly, they should be turned as often as every five minutes while in the fixing solution, and should not be removed until the paper is as clear by transmitted light as it was before silvering. The best way to determine this is by comparing the prints with a piece of photographic paper neither salted nor silvered.

3. *Old Fixing Baths.*

The economy (?) of some photographers is the cause of their prints fading ; for, in order to save a few cents, they use their fixing solutions over and over again, and doom to certain destruction all the prints fixed therein. The only safe way is to make sufficient fixing solution for each lot of prints, and use it but once.

4. *Insufficient Washing.*

In order to make the fading of prints a *certainty*, operators have but to place them in a tank of running water, where they are left over night, all stuck together in such a manner that there is no change of water between them, and in the space of a few months the prints will assume a beautiful yellow colour.

Some tanks are arranged in such a way that the prints are kept constantly in motion, and have full benefit of the fresh water with which they are constantly supplied. In this way the prints are thoroughly washed in a short time in *warm* weather ; but in winter another difficulty presents itself, for the low temperature of the water crystallises the hyposulphite of soda, and any amount of washing in cold water will not remove it.

When removing prints from the washing-tanks, in cold weather, a slimy feeling will be noticed. Place the prints in a dish of water, blood warm, and an oily substance will be seen to dissolve ; this oily substance is the hyposulphite of soda, which was crystallized by the cold water, but is dissolved by the warm water, and is sufficient proof, we think, that prints cannot be washed in very cold water.

Having shown the difficulty of washing prints by the means usually employed to accomplish that object, we will give the method practised by ourselves, by which our prints are washed thoroughly with a few pails of water, and in connection with the precautions of having a neutral fixing bath, and fixing the prints thoroughly, we have never had the mortification of seeing them turn yellow.

We have two wooden dishes, 20 by 24 inches, and 4 inches deep, which we employ in our washing operations as follows:—

As fast as the prints fix, they are taken out of the hyposulphite of soda bath and placed in one of the dishes, in which we have two pails of water. When all the prints are in the first dish, they are shook down for a few minutes, the water is thrown off, and the dish reared on one edge to drain. The second dish is then brought in use by placing in it two pails of water. By this time the prints in the first dish have drained nearly dry ; take them out, a few at a time, and place them in the second dish, shaking them down between each addition, taking care that they are loosened so that the water washes each print. When they are all in the second dish, throw off the water and let drain, and commence with the other dish as at first. Six or eight changes of water will be sufficient to wash the prints thoroughly. In summer the water is warm enough in its natural state to wash prints; but in winter, enough hot water should be added to make the water in the dishes feel comfortable to the hands. The dishes should be washed out every day before using. The draining of the prints should in no case be omitted, as it is of as much importance as any part of the washing operation.

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* *Humphrey's Journal.*

By this method of washing, we free our prints perfectly from hyposulphite of soda, and our slumbers are never disturbed by visions of floods, damages to pay, &c.

ON THE RECOVERY OF GOLD AND SILVER RESIDUES BY A WET PROCESS.

BY J. LIEBIG.*

By adopting the following mode of proceeding I am enabled to reduce any gold or silver residues without having recourse to the usual smelting operations, which always involve a certain amount of skill and attention.

Gold Residues.—Into a glass vessel containing the waste gold solutions I put a few strips of zinc-sheet, adding a small quantity of carbonate of soda to neutralise the acidity, and to prevent the solution from attacking the zinc too freely. After standing two or three days, the whole of the gold will have been precipitated. To ascertain whether such is the case, a few drops of the solution are put into a test-tube, and rendered slightly acid by the addition of a little hydrochloric acid; a small quantity of sulphate of iron solution is then added, and if no brown precipitate of gold is observed, that metal has been completely separated, and the clear transparent fluid may therefore be poured off. This process may be repeated till a sufficient quantity of precipitated gold is obtained for further purification. All the gold adhering to the zinc cuttings must be carefully removed, by treating them for a short time with hydrochloric acid. The precipitate, after being washed and heated to redness, is put into an evaporating-dish and boiled two or three times with dilute hydrochloric acid, and then thoroughly washed.

The gold, thus purified, is then put into a flask and treated with a little nitric acid (free from chlorine), in order to separate any foreign metals, such as zinc or iron. This treatment with the nitric acid is repeated till no precipitate is formed by the addition of either ammonia or sulphide of ammonium. Finally, a small quantity of pure hydrochloric acid is gradually added till the whole of the gold has been dissolved. Small particles of organic matter mixed with dust and sand are generally present, and as these may be mistaken for gold, it is best to filter the chloride of gold solution, diluting it with a little distilled water, and thus saving both time and material. The residue in the flask, which contains but little if any gold, is then poured back into the waste gold solution to be worked a second time.

Silver residues are of two kinds:—

1. Fixing solutions containing either soda or cyanide of potassium.
2. Residues from the washings of unfixed prints and old dipping-baths.

The silver may be recovered from the dipping-baths in the form of chloride in the ordinary way, and then reduced to a metallic state by the method given below. The silver bath is first diluted with water, in order that the iodide may become separated, and is then poured into a shallow evaporating-dish, having a few plates of copper laid at the bottom. After being allowed to remain for about twenty-four hours, the silver becomes deposited upon the copper plates in beautiful moss-like crystals. A test is applied, to ascertain whether the whole of the silver has been reduced, and the green liquid, which is a solution of nitrate of copper, is then poured off. The precipitated silver is thoroughly washed in spring or rain water. It is impossible to recover the silver perfectly pure without a trace of copper, as even when the silver has been treated with hydrochloric acid, I have obtained a bluish colour on testing it with liquor ammonia. This, however, is of slight importance, as when the silver is dissolved in nitric acid, the nitrate of silver crystallises out in a perfectly pure state, the greenish mother liquor remaining, which, of course, still contains a certain quantity of silver, being put back into the vessel containing the chloride. The nitrate crystals are put into a glass funnel stopped with a piece of glass, and carefully washed with distilled water by means of a wash-bottle, to remove any of the green mother liquor still clinging to them. The crystals are then dissolved in a little water, and recrystallised a second time, when they will be found to be perfectly free from any trace of copper.

The best mode of reducing chloride of silver is by treating the same with liquor ammonia till it colours red litmus paper blue, and then placing it in a glass vessel with a few strips of zinc. The precipitate is well washed, heated in a porcelain crucible, and finally converted into nitrate of silver by the process just described. Silver residues obtained from developing solutions which contain simply sulphate of iron and pyrogallic acid are easily treated, as the silver may be precipitated in an almost perfectly pure condition. The clear brown fluid is then poured off, and the silver well washed. These residues I decompose with ordinary nitric acid, and afterwards precipitate them with hydrochloric acid.

Washings containing but a trace of hyposulphite of soda are likewise reduced with zinc in an earthenware jar, or if in large quantities, a wooden cask may be used, but the wood will take up a small quantity of the silver. The precipitate is washed, dissolved in pure hydrochloric acid, and filtered, to remove insoluble particles. The filtered solution, which is generally of a brown colour, on account of its containing a small quantity of iron, is then added to the other chloride residues. Silver residues containing large quantities of hyposulphite of soda are treated with zinc in a like manner, but the operation takes a much longer time in carrying out. The complete reduction of the silver is easily ascertained by adding to the solution a little sulphide of ammonium; if no black precipitate is obtained, all the silver has been extracted. The precipitate is afterwards washed and treated as above.

(*Note by the Editor of the Photographische Mittheilungen.*)

There is no doubt that silver residues may be recovered by a wet process in the manner above described, but it involves the performance of many elaborate details and much labour. Chloride of silver is very imperfectly reduced by the action of zinc, and the metal thus obtained would still contain a small proportion of chloride, which would go over into the nitrate. M. Liebig's method of treating the hyposulphite of soda residues is, however, a very good one, and the product thus obtained would, on smelting, yield a nearly pure metal.

EXPERIMENTS WITH MR. M. CAREY LEA'S COLLO-DEVELOPER.

BY MESSRS. J. C. BROWN AND HUGH DAVIS.*

Desiring to make a fair trial of the merits of Mr. Lea's collo-developer for our own satisfaction, during the last week we made a large number of experiments with it, and have arrived at the following conclusion:—

The collo-developer acts more rapidly than the ordinary iron developer, the high lights being very intense (flashing out the moment the developer touched the plate); but the middle or darker portions of the picture, do not in our experience, compare with the iron development in softness and delicacy of middle tints. A tendency to fog was frequently noticed in the high lights when the development was pushed to bring out the middle tints.

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* *Photographische Mittheilungen.*

* Read before the Philadelphia Photographic Society.

We both experienced difficulty in making Mr. Lea's developer.

On adding the solution of protosulphate of iron to Mr. Lea's solution, a slight milkiness appeared, which filtered off entirely clear; but after standing twenty-four or forty-eight hours, a bulky precipitation of oxide of iron was noticed. This was carefully filtered off, but the developer worked unevenly, giving a curious deposit in the sky, also quite streaky. Alcohol was added, which made it flow more evenly, but did not remedy the latter difficulty.

Many of our trials were made with a stereo box, cutting the glass before coating the plate; after exposure, breaking the glass, and developing one with the collo, and the other with the iron. One of the stereo plates with the above-mentioned deposit, with questions in regard to the precipitation of iron, was sent to Mr. Lea, who replied that he never found his developer to give such results before, but suggested that some difficulty might occur from the iron used, asking a trial of some of his own. Another solution was at once made on Tuesday, at 3 p.m., which, up to this time (Wednesday, at 3 p.m.) has not precipitated.

One more trial was made this morning with the fresh solution. A cut stereo plate was coated with collodion, containing iodide of am. five grains, bromide of cad. two grains, dipped in a new bath, which was known to work well; exposed for thirty-one seconds on the Pennsylvania Hospital Square, with a pair of Jamin lenses, view adjustment, focus about seven inches. The plate was broken, and developed, No. 1 with collo; No. 2 with protosulphate of iron twenty grains, water one ounce, acetic acid two drachms. The development with the collo came up quite fast in the bright portions, but slow in the shadows (showing decided evidence of fogging in the bright lights). The plate was at once washed, and No. 2 taken up. Ordinary iron was used: development rather slow, but uniform, coming up gradually. The developer was kept on longer than the collo, but no tendency to fogging was observed. The two negatives are here for your inspection. No difficulty was found in flowing this collo-developer, although no alcohol had been added, as in every trial made before.

In concluding our experiments, which have been made with a great deal of care, we are of the opinion that Mr. Lea's collo-developer is not, in its best working, quite equal to the ordinary iron developer for landscape or portrait views. In regard to copies, we think the preference might be given to the former.

Further trials confirm the above in most points. Mr. Lea's developer was made from his formula, viz. :—

Protosul. iron	1 oz., avoirdupois
Water	16 „ fluid
Mr. Lea's preparation ...	½ „ „

On first trial it was found to work unevenly: one ounce Atwood's alcohol was then added; it was flowed then without difficulty.

The iron developer was made as follows :—

Protosul. iron	240 grains
Water	8 oz.
Acetic acid	1 „

The collodion used was an excellent sample, furnished very kindly by Mr. Wenderoth. We are about to experiment further in this direction.

Since the above article was written, a marked precipitation has taken place of oxide of iron in the collo-developer made with Mr. Lea's iron.

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THE NEGATIVE.—HOW TO MAKE IT.*

BY PROF. TOWLER.

As soon as the plate has been coated with collodion, the latter is allowed to set; that is, to dry and to be just consistent enough as to receive an impression from the fingers without being disintegrated; it is then immersed in the silver bath. Now there is quite a knack in coating a plate with collodion, and there is also some care required in the immersion of the plate in the silver bath.

The collodion is allowed to flow out in sufficient quantity so as to cover the plate easily and rapidly, beginning at the right hand and more distant corner, taking especial care that it does not accumulate at this corner and run over the edge to the surface beneath. This corner being now thoroughly covered, the plate is tilted obliquely, thus allowing the collodion to flow quickly all over the more distant end of the plate, and then, by a direct tilt, to let it flow longitudinally to the nearer end. There must be no stoppage in the flow of the collodion, much less a reflux current; for either of these events would cause a line to be seen on the collodion film, which also would be reproduced in the print afterwards. As soon as the plate is completely covered with collodion, the excess of the latter is poured off at the right hand nearer corner into the stock vial. Whilst the plate is thus draining, it is oscillated backwards and forwards in the direction of the plane of the plate, as if it were poised on this corner. The intention of this oscillation is to prevent streaks and ridges on the film produced by the collodion flowing in one and the same direction. When the collodion no longer drops from the corner above-mentioned, the plate is held in a horizontal position, which causes the incipient ridges and reticulations to settle down, and thus form a uniformly smooth surface. But all these operations of coating the plate with collodion, draining, and oscillating, &c., must occupy but a small portion of time, otherwise the collodion will set, and it will be impossible to get a completely smooth surface afterwards.

If the collodion is too thick, it will form a sort of coagula, or clouds, which are exceedingly offensive. In this case the collodion must be made thinner, or the plate must be coated more bountifully and with much more rapidity than is usually required. In summer, the collodion is apt to grow thicker from day to day, by reason of the rapid spontaneous evaporation of the ether and alcohol; but the former evaporates more easily than the latter, and consequently a stock bottle can always be kept in readiness, containing a mixture of ether and alcohol in the proportion of two parts of the former to one of the latter, to compensate for the inequality in the evaporation.

If a particle of dust or a small fragment of indurated collodion is carried upon the plate with the collodion, it is very possible that this will become imbedded on the film, and thus spoil the film. It is useless to flow the plate twice so as to get rid of the trouble; sometimes, however, the particle can be quickly and dexterously removed with the corner of a piece of paper. The safest plan, however, is to rub off the collodion film, and throw the plate into the soaking bath of chromic acid, and begin with a perfect plate.

The immersion of the plate in the silver bath must be even and continuous; for if the plate is arrested but for a moment in its progress, there will be made visible on its surface the sign of this stoppage in the form of a line in the collodion right across the plate, which no subsequent manipulation can remove. On the other hand, if the plate be plunged down violently, the collodion film is liable to be separated from its adhesion to the glass at the lower edge; and this incipient separation will frequently afterwards determine its total sliding off. The residuum of pulverulent matters at the bottom of the bath are, by such proceeding, stirred up, and when the turbidity subsides, it leaves its marks on the collodion film in the form of fine dust, which gives rise afterwards, during development, to all the evils and annoyances of pinholes. By a violent immersion, too, of the plate, it is liable to be jerked off from the dipper; and then comes a nice mess of trouble for our novice.

How can you get the plate out again?

Take two pieces or strips of glass, and placing one beneath the upper edge of the plate, and the other above this edge and right opposite to the former, you may, by compressing the slips of glass beneath the finger and thumb of the right hand, and by raising this hand, bring it entirely out of the bath, or place it upon the hooks or resting protuberance of the dipper, until the film is sufficiently sensitised. This operation may be performed with so much dexterity and success as not to injure the film for its subsequent functions.

Move the plate on the dipper up and down gently, immediately after its immersion for a few seconds; this will prevent the deposition of minute particles on the film at a time when the latter has scarcely set, and when it receives them with so much facility, and allows them to nestle in its soft substance, which afterwards hardens or coagulates around them, and prevents their removal in the subsequent operations of developing, fixing, and washing.

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* Continued from p. 394.

Furthermore, this gentle motion of the plate causes the silver solution to come more quickly in contact with the collodion film, which, containing alcohol and ether, acts as if it had been oiled, and resists the action of the bath, not uniformly, but in streaks and patches. The disappearance of this apparent greasiness of the film is the criterion by which you may judge when all further oscillation of the plate would be unnecessary.

How long is the plate to be kept in the bath?

A very pertinent question, and one that cannot be quite correctly answered. Nevertheless, our acquaintance with the subject, though not complete, is pretty considerable. Immediately after immersion, the film assumes a bluish tinge, which gradually becomes more and more cream-like, when finally the film has a uniform cream-white appearance on both the anterior and posterior surface. At this stage, the decomposition of the soluble iodides and bromides in the film into the insoluble iodide and bromide of silver is complete; and, very naturally, we conclude that all further immersion in the bath will be unnecessary, and useless in the way of effecting any more decomposition. From this we may deduce that, as long as the film is bluish, it is not in a suitable condition for our purpose. But it may happen that a very long immersion in the bath will not bring about the desired cream-like colour. The fault may be in the bath or in the collodion. If the bath is very old, and consequently highly impregnated with ether and alcohol, and at the same time very much exhausted of its silver, there is always more or less difficulty in getting a good film even with a long immersion. What to do with such a bath in such a condition we will tell you bye-and-bye. But the trouble most probably is located in the collodion itself: the latter may contain either too small a quantity of the bromo-iodizing or too little pyroxyline. Take the case when the collodion is exceedingly thin and flows over the plate like water: if in this case the film is bluish after a long immersion, we conclude that more pyroxyline is necessary, which is added systematically, and by degrees, as long as there is a gradual amelioration in the creaminess of the film in the silver bath. If this amelioration is not in proportion to the fresh increments of soluble cotton, you may conclude that the bromo-iodizing is defective. Add, therefore, more of these salts until the desired result is attained.

Now, supposing that the collodion and bath are both in a normal condition, the great problem is still to be solved: How long must the plate remain in the bath? We believe it was Major Russell who first called our attention to this subject; he asserted that, if all the soluble salts in the collodion film are completely decomposed into the corresponding silver salts, then fogging will commence. This is really so; for the silver solution has by this time penetrated through the collodion, and has arrived at the glass surface, where it accumulates between the film and the glass, and where, when the iron developer is poured on, pure silver is deposited on the glass plate, giving rise to a distinctly foggy plate, with here and there more distinct marks of silver reduction, which is only a higher stage of fogginess, and which is produced by the unequal accumulations of silver solution beneath the collodion film. But these accumulations are not liable (or, at least, not so liable) to take place between the collodion film and the albumen film, and in those cases where the albumen substratum has been applied; hence arises one of the peculiar benefits of such a substratum.

But when such a thin layer of albumen is not previously applied to the glass, we have to employ much judgment in determining when to stop sensitizing the plate.

We must stop before the silver arrives by permeation at the glass surface beneath; that is, we must leave a thin layer of the collodion film—that portion of it which is in immediate contact with the glass—unaltered, or only partially altered.

Thus, then, if we can manage by the eye to discriminate when the outer surface has a creamy white appearance, and when that next to the glass is still bluish, we may rely upon it that this is the proper condition of sensitization. This discrimination is practicable.

To produce an equality or uniformity of sensitization, it is necessary that the coated plate should be flat at the bottom of a dish, when the pressure of the silver solution throughout will be uniformly equal. Such a uniformity of pressure cannot be attained when our silver baths are vertical; and our practical photographers are well aware that certain troubles always appear in a certain part of the plate, and not over its whole surface; that one part of the plate may be fogged, whilst the other is free from this defect. Such troubles arise from the unequal action of the silver solution, produced by the want of an equal pressure of the fluid on all parts of the plate at the same time.

By watching the progress of sensitization in the manner indicated, you will be enabled to obtain very bright pictures—in fact, surface pictures; besides this, you will be enabled to get great intensity in the shadows, whilst there is all the requisite detail in the lights, the contrasts are still better, but without any lack of intermediate gradations. Whereas, if the film is completely sensitized throughout, there is great liability, not alone to fogging, but to a clogging up of the different gradations, and to unequal development.

Now, to effect this mode of sensitization of a collodion film, it is evident, or at least would appear so, that baths of different degrees of strength will not act equally in producing the desired result.

It is very probably that, as far as the permeation or diffusion of the silver solution is concerned, a weak or a strong solution will not differ very much; by which we mean, that it will take about the same length of time for a strong solution and a weak solution to get to the glass surface through a given film; but the amount of decomposition will naturally be very different in the same time. Starting with this view, we are led to select a strong silver bath in preference to a weak one, in order to attain the end in view, which consists in getting a cream-like colour on the outer surface of the collodion, whilst the inner surface is still, comparatively speaking, blue.

A short immersion in a strong bath is our rule.

The Silver Bath.—How to Prepare It.

See when you buy your nitrate of silver that it is distinctly crystallized in large flat tabular crystals; that it is uniformly so crystallized, and exhibits no mixture of a crystallization of a different nature.

Secondly, having made a selection of the silver salt, dissolve a drachm of it in an ounce of pure water, and immerse a piece of blue litmus paper in it for an hour. If the salt has been recrystallized—and such is the article you have to buy—it will be neutral, and the blue litmus paper will not change colour in this time. If it becomes red, we should be inclined to get the salt exchanged. We will suppose, however, the paper does not change colour.

Take distilled water in preference, or, next to this, rain water, forty ounces; nitrate of silver, four ounces, avoirdupois; make a solution. This is the silver bath. Coat a four-fourth plate with bromo-iodized collodion, and leave it in this bath over night. Filter the bath if necessary; there will, however, scarcely be any necessity for this trouble, if the water is pure. It is now ready for use. It will be exceedingly sensitive in its present condition. Coat the plate, and watch the progress of sensitization by the aid of a yellow light, and in accordance with the instructions above given. Be careful not to let the plate remain too long in the bath; that is, not until the back of the film is as white as the front; for in this case your picture, with such a sensitive bath, is sure to be fogged. Take it out in time, and expose in the usual manner, only not quite so long as you would if the plate had been sensitized in an old bath.

Should it happen, notwithstanding every precaution and correct manipulation, that the picture fogs during development, you must acidify the bath gradually with nitric acid, until the desired condition is attained. For this purpose mix together one drachm of nitric acid with seven drachms of water; a drachm of this mixture will contain seven minims and one-half of nitric acid. Begin, therefore, with one drachm at a time; probably one drachm will correct the evil; if not, add more.

During exposure, your object is supposed to be illumined with the requisite amount of light and in the proper places; your camera during this time must not be illumined, and the atmosphere in front of the camera and between the camera and the sitter must not be illumined; all extraneous light, except that required to produce the picture, must be subdued. Just now, whilst we are penning these remarks, there is a window between us and the Medical College, which is distant eight rods from the window. The sun is shining brightly upon the panes of glass in the window; but the College is almost invisible in this blaze of light; we see the illumined glass of the windows: your picture on the ground glass, if the lens is in a blaze of light, will be as indistinct as the College building; the lens and the lighted atmosphere become the object, and not the sitter beyond. Put your camera in a dark room, and let the lens just peep through a tiny window, sufficiently large, of course, to admit the pyramid of light from the sitter and the background.

Another thing to be attended to.

The window between us and the College is covered with vapour (of course this was on another occasion); the *gude wife* was either brewing, or washing our "*twa shirts*," whilst we sat with our coat buttoned up to the chin *à la militaire*, we do not accurately recollect which of the two; the College was invisible again. "The deuce take it! Is not water as transparent as glass?" It appears not. "Eureka!" said we, as said Archimedes a long time ago, just like us, without a shirt on. This is a capital discovery: wipe your lenses with a piece of very soft dry buckskin, until there is no moisture on them, before you attempt to take a negative, otherwise you will see nothing on the ground glass but vapour and pictorial indistinctness.

We need scarcely remark, that a heap of dirt on either of the lenses interferes materially with the picture; hire a small boy to excavate it.

Finally, place on a placard, tacked upon your outer door, the following inscriptions:—

Hier darf man nicht rauchen.
Il est défendu de fumer içi.
No smoking allowed here.

(*To be continued.*)

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PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Two cases of photographic piracy of engravings were recently heard at Bow Street.

Henry Evans, of No. 1, Endell Street, photographic dealer, appeared to summonses charging him with selling pirated copies of two engravings—"Ordered on Foreign Service," from the painting of Mr. Robert Collinson, and "A Piper and a Pair of Nut-Crackers," by Sir Edwin Landseer, R.A., both the copyright of Messrs. Henry Graves and Co., of Pall Mall.

Mr. Montagu Williams, instructed by Mr. Bowen May, conducted the prosecution.

Mr. Montagu Williams stated that Messrs. Henry Graves and Co. had at a very large outlay secured the copyright of a number of valuable pictures, for the purpose of engraving and publishing them. It was the practice of certain photographers to obtain copies of the engravings and multiply them by photography, selling the piracy at a much lower rate than the prices of the genuine engraving. The present proceedings were taken under the recent Copyright Act (25th and 26th Victoria).

Mr. Henry Graves said that the photographs produced were copies from his engravings of "The Piper and Pair of Nut-Crackers," and "Ordered on Foreign Service." The former picture was not his property, but only the copyright. With regard to the other, both picture and copyright were his property. Not only were these photographs obviously taken from his engravings, but they actually included the inscription in which his name appeared.

Mr. John Rodwell, clerk to Messrs. Graves, stated that he went to the defendant's shop on three different occasions, and purchased copies of the engravings in question. On the first occasion, defendant, after showing him several photographs, brought out a portfolio, saying, "These are copyright." Witness asked him what he meant. He replied, "Only that we are not allowed to sell them." Witness asked if he should get into any trouble through it. He said, "No, not you; if anybody, it will be me. I should get into trouble if it was known to the publishers that I sold them."

Mr. Pickering, assistant to Messrs. Graves, said he went to the defendant's shop. He mentioned the name of Rodwell (understanding that the latter had said a friend would call). Witness said he wanted to see the copyright ones. He produced copies of those two engravings, and said the copyright was vested in the publisher as a protection against piracy.

Mr. Montagu Williams said the magistrate had power to order the defendant to give up any copies he might have in his possession.

Mr. Flowers.—Oh, certainly, that must be done before determining the penalty, which I have power to mitigate.

This case was accordingly adjourned, while the consideration of a similar charge against *Mr. Edward Hopgood*, of High Holborn, photographer and photographic dealer, was proceeded with.

Mr. Montagu Williams conducted the prosecution, and Mr. A. C. Pullen defended.

Mr. Montagu Williams said this was an offence of a far deeper dye. He had a considerable business, had been cautioned over and over again, and knew perfectly well whose property the copyrights were.

Mr. Graves gave the same evidence as before, as to the copyright. An original photograph of "Ordered on Foreign Service" had been registered.

Mr. Pullen submitted that this was not an original photograph in the meaning of the Act, which could only include photographs from life or from actual scenes or objects, not from a painting.

This objection was overruled.

Mr. John Cattermole, assistant to Messrs. Graves, stated that he went to defendant's shop on the 25th of July. He bought a lot of photographs, including two copies of "Ordered on Foreign Service," and three of a "Piper and Pair of Nut-Crackers." He asked witness what he was, and witness replied that he was in the trade. Witness then asked him what he should charge for them. He replied, he might charge 12s. 6d. for the "Ordered on Foreign Service," as the price was according to the risk. Witness paid him 3s. 6d. for the large copy of "Ordered on Foreign Service," and the smaller one he bought with some others (not copyright) at 8s. a dozen. The defendant told him to put the non-copyright ones in the window, but to be careful to whom he showed or spoke of the others.

Mr. Flowers.—Then he did not act on his own advice (a laugh).

The Witness said he had an introduction to the prisoner.

The Witnesses were cross-examined by Mr. Pullen, but without materially affecting his evidence.

Mr. Flowers said this was a case in which he could not possibly mitigate the penalty. These gentlemen embarked an enormous capital in the purchase of copyrights and publication of engravings. It was next to robbery. At the same time, he must remark, that on the same principle on which it was said that if there were no receivers there could be no thieves, no persons would make these piracies if no one would buy them; and many persons, who considered themselves gentlemen, did buy them—in his opinion much to their discredit. If they would not buy these pictures honestly, it was no honour to them to show them on their walls or in their portfolios.

Mr. Williams stated that Mr. Hopgood had taken a defiant tone when Mr. Graves went to his shop to see if he had any more photographs, and asked if he came with a search warrant. However, after looking through his stock, none could be found.

Mr. Flowers said it would be wise for Mr. Hopgood to throw himself on complainant's mercy. He (Mr. Flowers) could not mitigate the penalties, which were two of £10 and three of £5 each, and £1 3s. costs.

The other defendant having now returned,

Mr. Williams said the defendant was a poor man, and had given up all his stock, and therefore—though he (Mr. Williams) must press for the full penalty, yet he would undertake that Mr. Graves would not issue a distress (which was the mode of enforcement provided by the Act) unless the offence was repeated.

Mr. Flowers imposed the full penalties, which were seven of £10 each, making £70; and £2 6s. costs.

Ultimately, it was arranged that in both cases the penalties should be allowed to stand over, unless the offence were repeated; but the costs must be paid at once, which was done.

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Correspondence.

SPOTS ON ALBUMENIZED PRINTS.

Sir,—Having noticed the recent complaints relating to spots in albumenized prints, will you allow me to offer an account of my experience in the same? I was troubled for some weeks more or less with spots in my prints, varying in size from a pin's point to the size of a pea, and sometimes larger; the colour yellowish brown. I thought it the fault of the paper, and therefore obtained some from three different places; but the prints turned out the same. I then made a new sensitizing bath; still the result was the same. After that I made new toning baths, with no better result. To finish up my experiments, I determined to have a different sample of hyposulphite of soda for fixing the prints, and since then I have not been annoyed by spots in my prints. I therefore conclude that some impurity existed in the hypo which I had been using.

Such has been my experience, which may be of service to some of your readers.—I am, dear sir, yours truly, J. S.

Ipswich, August 21*st*, 1866.

Talk in the Studio.

NEW AND CONVENIENT HEAD-REST.—We recently examined, at the establishment of Mr. Hughes', in Oxford Street, "White's New Head-Rest," which possesses many conveniences which recommend it to the portraitist. In the first place, whilst it is fastened to the floor so as to secure perfect rigidity without the necessity of showing an obtrusive base, it possesses a lateral movement of a few feet, a groove in which the pillar slides being let into the floor. It possesses a support for the back as well as for the head. By the number of joints the greatest plasticity is afforded, and by the excellence of the workmanship, and of the clamping arrangements, the utmost rigidity and firmness are secured in the various positions it renders possible.

ORIGIN OF THE GORDON DRY PROCESS.—Our attention has been called to some remarks, in a contemporary, on the origin of the process we have recently had occasion, for simplicity and clearness of allusion, to identify with the name of Mr. R. Manners Gordon. As these remarks are characterised by singular misconception or misstatement, it is desirable that we should briefly state the origin of the process. The first mention of the process in which nitrate of silver is added to the albumen preservative was made in our columns upwards of five years ago by Mr. Bartholomew (see PHOTOGRAPHIC NEWS, Vol. V., p. 53). A few months later, a similar proposal was made in our columns independently by Mr. Hannaford, who, in conjunction with the South London Experimental Committee, worked the process out carefully, publishing full formulæ and details of manipulation (see PHOTOGRAPHIC NEWS, Vol. V., pp. 183, 193, 207, *et passim*). About three years afterwards, it was revived in some of the journals as the "New Fothergill Process," and was described in a pamphlet on dry processes, published at the time, under that name. We pointed out its connection with the names of Mr. Bartholomew and Mr. Hannaford in a notice of the pamphlet at the time. More recently Mr. Ackland gave an impetus to the practice of the process, by working out an excellent formula, and producing some exceedingly perfect results. The details were published in our columns last year, Mr. Ackland at the time very specially accrediting to Mr. Bartholomew the origin of the process (see PHOTOGRAPHIC NEWS, Vol. IX., p. 493). Seeing Mr. Ackland's formula in our pages induced Mr. Gordon to try the process, and, in the course of his experiments, to make the modifications by which he obtained the very perfect and rapid results we have described. Mr. Gordon, like Mr. Ackland, disclaimed process-manufacturing, and was induced to publish his formula simply because he found it yielded him better results than any other. It will be seen that the process was old when the pamphlet in question published the process under the misnomer of "The New Fothergill Process," and that it was first published in our columns upwards of five years ago. The modification in detail, yielding especially fine results, is the sole reason for the publicity it has recently received.

To Correspondents.

BEVERLEY.—If you do not use a condenser you do not employ the solar camera, and your exposure will necessarily be very long. You cannot have tried the use of the condenser, nor thought much upon the subject, or you would not state that you did not see the use of one. The object of the condenser is to gain the most concentrated light possible. The whole of the light of the sun is brought to a focus by means of the condenser, and the image of the negative interposed in the cone of rays is impressed upon the sensitive paper sufficiently for development in a few seconds. The formula you are using is not bad; but the print enclosed indicates imperfect manipulation. The paper has been imperfectly and irregularly permeated by the sensitizing solutions. By means of paper carefully prepared according to the formula you mention, with a clean, delicate, sharp negative, you may possibly get a good print with an exposure of from forty to sixty minutes without condenser, and probably in half that number of seconds with a condenser and direct sunlight.

W. G.—It is a great convenience, when using a larger plate than the stereoscopic size for stereoscopic pictures, to have a front which permits the separation of the lenses to be adjusted at will. To bring each image of the pair in its right position on a 7-inch plate, the lenses should be separated 3½ inches. But you can cut a good pair out of the print you have sent by cutting off a little from the outside of each half. The negative has been slightly under-exposed and over-developed.

C. MOON.—We have not tried the plan, but it is possible that by the use of such a lens of proper form and focus some advantage might be secured; but it is unimportant, as in working with artificial light it is of little consequence whether you have to expose eight minutes or twelve minutes. 2. The best tones we have seen in developed prints by means of the solar camera have been obtained with paper salted with a solution containing 7½ grains of bromide of potassium and 4½ grains of chloride of ammonium to an ounce of water, and excited with a 60-grain silver solution. The question of detail and contrast is one dependent very much upon the quality of the negative and the amount of exposure. 3. The quality of the paper will affect tone and vigour: Hollingsworth's machine drawing-paper gives good results. 4. Immerse the paper in the salting solution given above. It will answer for artificial light.

NAUTICA.—From the description and diagram you give of the markings on the negative at the end from which the collodion is poured, it appears most probable that they arise from the use of over-iodized collodion, in which case the remedy would be the addition of a little plain collodion to the iodized collodion. It is possible that the bath being out of order might cause something of the same kind; in which case add a little carbonate of soda, and sun the solution thoroughly; then filter, add a drop or two of nitric acid, and try again. It is most probable that it is the result of over-iodized collodion.

R. L. TATE.—The albumen being dissolved off the paper indicates that your bath is weak or alkaline, or both. Test for the latter, and, if necessary, neutralize. If the bath be not alkaline, it is manifestly very weak, and requires strengthening. 2. You have used a lens of much too short focus for producing the large head you enclose. If you use a lens of short focus with full aperture, you cannot get the whole head even moderately defined. Use a lens of longer focus, and employ a smaller aperture.

F. T.—You will see that we give the details of the origin of the process in another column. The question is of little consequence, but it is as well, perhaps, for the sake of others concerned, to place a definite synopsis of the facts on record. The article to which you call our attention is full of errors, which are not of sufficient importance to notice. We have never stated that the process was the best, but have simply described results which have come under our notice, mentioning the weak points as well as the advantages. We cannot undertake to say which is the best dry process. Everything considered, we prefer the collodio-albumen process. It is not the most rapid, but it is the most certain, and has yielded some of the best pictures ever produced. As a general rule, in proportion as a dry process is sensitive, it is uncertain. We are not in a position to speak very decidedly as to the certainty of Mr. Sayce's process, our personal experience with it being limited; but many of the pictures produced by Mr. Sayce are as perfect as it is possible to wish for anything.

W. E. M.—The lens is apparently of too short focus to cover a full-length figure on a carte properly. By using a smaller stop, you will probably get better definition on the feet. The negative was either a little over-exposed, or diffused light has acted a little on the plate, either whilst in the camera or in the dark room.

LUX.—You will find Mr. Hughes' paper on the subject in our last volume. His first plan was to dissolve gelatine in acetic acid, and add it to the iron developer. At present, we believe, he simply adds a little gelatine—from half a grain to a grain—to the ordinary iron developer. 2. In taking portraits in the open air, the greatest difficulty will of course be experienced when the sitter is illuminated by the strong light of a vertical sun. One of the most important points to be observed is the screening of the lens from direct or diffused light. Take care to place a large hood in front of the lens. You will see the result in increased brilliancy in your image.

R. F.—The rapid collodio-albumen process proposed some years ago in France consisted in leaving a trace of free nitrate on the plate, and using hot development. Such plates would not keep long, especially in hot weather. The use of collodion with a bromide only dates back as far as 1853. The use of bromo-iodized collodion for negatives was strongly opposed a few years ago by some writers; but its use is now, we believe, universal. We prefer, for ordinary work, from half a grain to a grain per ounce. Simply iodized collodion in its best state, with everything perfectly pure, is very sensitive, but very liable to derangements, especially spots, comets, &c. It is not, so far as we have reason to believe, more sensitive in its best condition than bromo-iodized collodion under its best conditions. Our conviction is based upon many hundreds of careful experiments.

WE are compelled to defer attention to several correspondents until our next.

Photographs Registered.

MESSRS. S. AND W. SMITH, Rothesay,
Photographic Group of Marquis of Lorn, and Lord Archibald Campbell, &c.
Photographic Group of Marquis of Lorn, Lord A. Campbell, and Lord Ronald Sutherland.
Stereoscopic Group of Marquis of Lorn, and Lord Ronald Sutherland.
Stereoscopic Group of Duchess of Argyle, Marquis of Lorn, &c.
Stereoscopic Group of Ladies Edith and Frances and Lords Colin and George Campbell.
MR. J. HICKS, Chester,
Three Photographs of Rev. S. Luke.
MR. J. W. HALL, Winterton, Lincolnshire,
Photographic Group of Choral Festival, Appleby.
MR. F. OTTO, Redhill, Surrey,
Photograph of the Townhall, Redhill, &c.

THE PHOTOGRAPHIC NEWS.

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DISTRIBUTION OF FOCUS *VERSUS* SHARPNESS.

The old question of depth of focus, or distribution of definition, as opposed to extreme sharpness, in one plane, and the complete absence of definition in many others, continues to crop out from time to time as a subject of vital interest to photographers generally, without, however, any definite canons being fixed, or, indeed, the principles upon which the whole question rests being generally understood or recognized. An able paper, read at the Nottingham Meeting of the British Association, again revives the subject and the considerations belonging to it.

In a perfectly corrected lens the aim of the optician is to unite on one plane the various rays of different refrangibility reflected from one plane. Thus, in copying a flat surface, a perfectly corrected lens will effect this over a certain field with microscopic sharpness. But in reproducing an image of a solid body—such, for example, as the human head—it is obvious that, as the rays proceed from various planes, they must come to a focus on various planes; and in delineating this head on a flat surface, one portion of it only can be in focus. If the eye be perfectly sharp upon the gronnd-glass, the tip of the nose, the ears, &c., must be imperfectly defined; and thus, whilst one point is rendered with microscopic sharpness, other portions are fuzzy, and scarcely defined at all. In small images this is an evil scarcely observable: the difference in the various planes in relation to the distance is so inconsiderable as to produce but little perceptible loss of definition anywhere. But when the picture to be produced consists of a large head, the absence of definition in the various planes becomes a serious evil. Nor is this all. Whilst the want of definition in some portions is a great defect, the excessive sharpness on one plane is an evil of not less magnitude. The minute rendering of wrinkles, freckles, and rugose texture, if the focus be on the cheek, is as offensive as the absence of all definition in other portions, issuing in a blurred or bulbous nose, or imperfectly made-out ears, or curls represented by patches of uncertain character.

From the first days of photography this has been felt to be an evil, and Mr. Claudet, one of the earliest workers in photography, if not the oldest portraitist, some twenty years ago, we believe, gave attention to the subject, and endeavoured to provide a remedy. Later still, Sir William Newton proposed to turn the lens a little out of focus in portraiture, a suggestion in which the fact is overlooked, that if the focus is not on any portion of the face, some portions must be more out than ever. Another suggestion made, was to place some partially transparent medium before the lens, to prevent excessive sharpness. Within the last few years a Spanish photographer proposed to suspend a thin white gauze veil in front of the sitter, so as to soften asperities of texture and colour, and secure a soft picture. Other photographers have proposed to print through some thin transparent medium, such as talc or a thick coat of varnish, which, by destroying extreme sharpness, produced softness, and modified the effect of coarse texture. In some cases photographers have gone so far as to print with the back of the negative in contact with the sensitive paper, to effect the same purpose.

The plan proposed by Mr. Claudet, if not absolutely new in fact, is certainly new as a deliberately avowed proposal. He suggests altering the focus of the lens during exposure, so that every plane in the object shall be alternately sharply defined, the confusion caused by the superposition of a sharp image over an imperfectly defined image, and *vice versa*, producing the softness and gradation desired. Whilst no part is left with offensively sharp definition, none is left with an offensive want of definition. We have known this occasionally attempted at various times for years, but only as a subterfuge which none would have the courage to admit or to recommend. We have heard it said that Mrs. Cameron resorts to this practice to secure many of her best results, in which depth of definition without moved or blurred images is secured. Mr. Claudet, after carefully considering the subject, unhesitatingly avows his conviction that advantages in pictorial delineation are to be gained by such a course, and equally unhesitatingly and unreservedly gives the world the benefit of the suggestion. We thank him heartily for the weight of his authority thrown into the scale on this subject, in which he practically endorses a proposition we have often enforced, when dealing with the artistic side of photography, namely, that success is the touchstone of legitimacy, and that any method which produces the best pictorial results is to be justified and commended.

The method which has been secretly practised by some, has consisted in moving the body of the camera or the lens itself by means of the rack and pinion during the time of exposure. Mr. Claudet proposes to make the back lens of the portrait combination movable, so that the distance between it and the front lens may be readily altered. By bringing the back lens closer to the front lens, the focus of the combination is shortened; and by removing it further away, the focus is lengthened. By a gentle movement, within previously ascertained limits, during the time of exposure, a soft image with considerable distribution of focus is secured, as was illustrated in the prints exhibited before the Mathematical Section on Monday.

Admitting the importance of the end, and the legitimacy of the means, the next question arises, Are these the best means? The most obvious objection is, that in a rapid exposure there is not time for such movement; and the next, that, in any exposure, there is some risk of general movement in attempting such an operation. The answer to the first objection might be, that it is always possible to lengthen the exposure by reducing the aperture of the lens;

but the natural rejoinder is, that, as a rule, the shorter the exposure the better the expression, and that it would be difficult by any means to compensate for loss in this respect. In regard to the danger of movement, it is obvious that provision must be made against it by having the camera and stand as rigid as possible, and by careful manipulation.

But there is another mode of securing this distribution of definition to which we have for years past directed attention, and for which we must be indebted to the manufacturing optician. We have constantly, at intervals, insisted on the necessity of opticians producing lenses with greater depth of focus. It has often been replied that depth of focus in a lens is the result of imperfect correction, and that a lens possessing what is termed depth of focus, is a bad lens. This is simply begging the question. The term badness, in such a case, must entirely depend on circumstances. Regarding the lens as a tool to produce pictures, that must be the best tool which produces the best result. That which may be a bad lens, judged by some optical standard, may be a very good one for producing portraits from life. This quality of depth of definition is produced in a lens by the presence of a certain amount of positive spherical aberration which, from an optician's point of view, is a defect. With a lens possessing such a defect, if it exist in a moderate degree, absolute sharpness cannot be produced on any plane; but approximate sharpness may be obtained through several planes, and at the same time the softness which is produced by the hazy, instead of the accurate, definition of freckles, wrinkles, &c., is secured. It is practically producing the portrait with a crayon, softening down with the stump, instead of by means of a very fine pointed steel pen. If the portraitist could say to the optician, Give me a lens which shall produce heads of a given size, say two inches long, with the camera at a distance of say, fifteen feet; it would be quite possible to provide a lens which would define every part of such head sufficiently and softly, without unsatisfactory blurring in some parts, or unpleasant detail in others. But if the same lens were required either for small images requiring greater sharpness, or for copying subjects with fine lines, its performance would not be satisfactory, a general want of crisp definition being the result.

The point to be secured, then, is to induce opticians to make lenses for specific work with a much greater depth of definition than has hitherto been attempted, and for photographers to be content to use such lenses for such work only. The great danger is, that spherical aberration, if left by carelessness or without judgment, is a bad quality in a lens; but we want skilled opticians to use judgment in giving just the amount required for given work, and no more. This quality is to a great extent present in the new triple portrait and group lenses we have recently noticed as produced by one of our best opticians, who has shown himself anxious to conform to the wants of the art of picture-making, rather than to insist on picture-makers endeavouring to conform to what they have called the laws of optics, and which have been the laws of opticians. We hope to see consideration for pictorial conditions still further extended. In the meantime, we repeat, that photographers are highly indebted to a man of Mr. Claudet's standing as an optical authority, for giving such an able exposition of the necessity for improvement in this respect, and for giving the weight of his name and reputation in favour of the adoption of even a mechanical expedient, rather than lose the artistic qualities to be obtained by soft and distributed definition.

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THE MAGNESIUM LIGHT.

The development of the application of magnesium for illuminating purposes has been well illustrated at the last two meetings of the British Association. The meeting at Nottingham has witnessed its first successful application to the purpose of lighting a vast apartment for a period of three hours. The mechanical difficulties attending the continuous combustion of the metal in the form of wire or ribbon, tended, amongst other things, to delay the general use of this source. Mr. Larkin has devised a method of overcoming this difficulty by burning the metal in the form of a powder, which, contained in a reservoir, drops gradually through a small aperture like that of an hour-glass, and so preserves a steady flame.

Mr. Larkin demonstrated the working of this method before the Chemical Section of the Association, and explained the mode of working. The practical difficulties of obtaining a steady, pure, white light for a continuous period appear to be met perfectly. One of the objections raised by some at the conversazione was to the effect that the bluish-white colour of the light was not altogether favourable to the complexion of the ladies. This Mr. Larkin proposes to obviate by the addition of a minute proportion of a salt of strontium, which will change the tint from bluish-white to a white with a slight rosy tint. He showed that by preserving a light by means of the small jet of gas which issues from the same aperture as the magnesium, the intense light could be obtained or shut off at a moment's notice. The sand mixed with the metallic powder drops during the burning upon a small receptacle, which, as it becomes weighted with the sand, once in a few minutes acts upon a small lever, which passes over the orifice at which the metal is burnt, and so clears away any tendency to incrustation with the products of combustion. Numerous other minor clever mechanical arrangements are combined in the lamp, which give it great efficiency.

The wholesale price of magnesium is now about three shillings and sixpence per ounce, already an immense reduction upon the price at which the metal was introduced to the market a year or two ago. Should the demand become greater, doubtless the price will become much lower. Mr. Larkin estimated the cost per hour of illuminating a building with the light by his method to be about twenty shillings per hour, a price obviously prohibitory to general use. The experience of photographers in connection with hyposulphite of soda, &c., however, suggests the enormous decrease in price consequent upon large consumption; and so soon as a definite means of utilizing this light for illuminating purposes shall increase the demand, photographers may depend upon having an agent, which has already promised to be of valuable and varied application in their art, available at a price which shall not render its use only possible as an extravagant and occasional luxury. Mr. Larkin has promised to devote an early evening to a demonstration of the facilities presented by this lamp before the South London Photographic Society, when many of our readers will have an opportunity of a personal examination of this advance in the application of magnesium. We append Mr. Larkins' description of the lamp.

The distinguishing peculiarity of these lamps (which may be variously arranged to suit widely different purposes) is, that they burn magnesium in the form of powder, instead of ribbon or wire; and that they do not depend on clockwork or any similar extraneous motive-power for their action. The metallic powder is contained in a large reservoir having a small orifice at the bottom, through which the powder falls, simply by its own gravity, like sand in an hour-glass. In order that a sufficient orifice may be used, and to facilitate the steady flow of the powder, it is mixed with a quantity of fine sand or other diluting material; the proportion of powder to sand being varied according to the amount of light required. After leaving the orifice of the reservoir, the stream of metallic powder and sand falls freely through a metal tube, into the upper end of which a small stream of ordinary gas is also introduced. The mingled streams of powder and of gas thus flow down the tube, and escape together at its mouth, where they are ignited, and continue burning with a brilliant flame as long as the supply of gas and metal is maintained. As the metal becomes consumed, the sand with which it was mixed falls harmless into a receptacle provided for it, while the fumes are entirely carried away by a small tube-chimney into the outer atmosphere.

Immediately below the orifice of the resorvoir there is a valve, to either regulate the quantity or entirely arrest the flow of the metallic powder, which valve may be opened and shut at pleasure. When it is desired to light the lamp, the gas is first turned on, just sufficiently to produce a very small jet at the mouth of the tube; which small jet, being once kindled, may be allowed to burn any convenient time, until the moment the magnesium light is required. All that is then needed is, to turn on the metallic powder, which instantly descends and becomes ignited as it passes through the burning gas.

This action, of turning on and off the metallic powder, may be repeated without putting out the gas, as often and as quickly as desired; so that, in addition to the ordinary purposes to which lamps are applied, an instant or an intermittent light of great brilliancy, suitable for signals or for lighthouses, may be very simply produced, with certainty of effect, and without the smallest waste of metal.

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British Association for the Advancement of Science:

The Thirty-sixth Annual Meeting of the British Association, which was held under the Presidency of Mr. W. R. Grove, Q.C., F.R.S., &c., at Nottingham, has just concluded. Without the announcement of any great or startling novelty or discovery in any department of science to give *éclat* to the session, it has nevertheless been one of the most generally satisfactory meetings held by the Association for a long time. Singularly enough, Nottingham was a town of which little was generally known, and little interest was anticipated from the town itself or its associations, beyond what might be found connected with the manufacture of lace or hosiery. Everyone was agreeably disappointed, therefore, to find one of the prettiest provincial towns in England, quaint and picturesque in many of its ancient buildings, and really beautiful in its modern domestic architecture. In no town which we have visited have we seen so many well-built and picturesque suburban residences, the majority of which were in excellent taste, generally pure Elizabethan or the best modifications of domestic Gothic architecture. The strange and interesting associations of the rock caves with which the town abounds, the residences of inhabitants of this island long anterior to the Christian era; the beautifully wooded uplands which abound all around; the cleanliness of the town; the energy and courtesy of the honorary local Secretaries, Dr. Robertson, Mr. E. J. Lowe, and the Rev. J. F. M'Callan; and, above all, the boundless and hearty private hospitality, all contributed to invest the proceedings generally with a highly satisfactory character.

THE KEW REPORT.

The proceedings opened on Wednesday, the 22nd, by the reading of various reports. That of the Kew Committee states the satisfactory progress of photographic self-registration of magnetic and barometrical records, and a suggestion is made for a further application of photography for preserving records of thermal observations. We make an extract from the Report of the Committee referring to the subject:—

> The Committee are also desirous of bringing under the consideration of the Council the expediency of proceeding in the formation of a memoir on the periodic and non-periodic variations of the temperature at Kew, as a normal station of British meteorology. Similar works have, for some years past, occupied the attention of the most eminent amongst the Continental meteorologists as being, in fact, the foundation of all *scientific* knowledge of the climatology of their respective countries. A memoir on the periodic and non-periodic variations of the temperature at the magnetical and meteorological observatory at Toronto in Canada, has been printed in the Philosophical Transactions for 1853, but not so much work has yet been systematically undertaken at Kew, although it is quite in accordance with the objects for which the Observatory was instituted, in familiarising British meteorologists with a system of tabulation they have hitherto unduly neglected. Daily photograms, taken from the thermograph constructed under Mr. Stewart's direction, will supply, in the most unexceptionable manner, the observational basis on which the memoir would be founded.
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> To obtain such photograms would constitute a very small addition to the duties of the assistant, by whom the daily photograms of the magnetical instruments are taken. The *tabulation* from the daily photograms of the temperature would be the only increase of any amount to the ordinary present work of the Observatory, and would require, possibly, the part services of an additional young assistant.
>
> The tabulation would supply twenty-four equidistant entries in every solar-day. The tables containing these entries, together with the photograms, after careful inspection by a proper authority, would be preserved for subsequent use. Five, or at most six years would constitute quite a sufficient basis for the determination of the periodic variations forming the first part of the proposed work, and would require about a couple of months of superintending care on the part of the person who might be director of the Observatory, when the observations of the five or six years should have accumulated.
>
> Nothing more than ordinary clerk's work, under such general superintendence, would be required.
>
> Should the Board of Trade be disposed to avail itself of the suggestion which has been made to them in respect to the Kew Observatory, the publication which has been suggested would become one of its first important duties.

THE PRESIDENT'S ADDRESS.

The Inaugural Address of the President, delivered in the theatre on the evening of the 22nd, was one of the most comprehensive and eloquent reviews of the philosophical aspects of science to which the members have listened. The opening sentence of his address suggested with wonderful force and vividness the influence of scientific progress, not merely on things outside of man, but on his very habits of thought and modes of being. He remarked, that if our rude predecessors, who inhabited the caverns with which the town abounded, could now rise from their graves and look around, it was doubtful whether they would possess sufficient knowledge to be surprised, or capable of viewing the developments of this day with wonder. He then vividly suggested a starting point, and a gulf of fact and thought for the imagination to bridge over in estimating the culture of this day.

Glancing, then, over the recent progress of science, and paying a tribute, in passing, to Mr. Warren De la Rue and Mr. Nasmyth, for photographic contributions to our knowledge of solar and lunar physics, the President launched into his favourite subject of the correlation of physical forces, glancing at photography as affording striking illustration of the conversion of force. It is impossible to do any justice to the address by attempting to give an abstract, even if we had space; we content ourselves, therefore, with a brief extract or two, which will especially interest our readers. Speaking of magnetism, electricity, light, heat, and chemical affinity, he said:—

> It seems to me (though, as I have taken an active part for many years, now dating from a quarter of a century, in promoting this view, I may not be considered an impartial judge), that it is now proved that all these forces are so invariably connected *inter se* and with motion as to be regarded as modifications of each other, and as resolving themselves objectively into motion, and subjectively into that something which produces or resists motion, and which we call force.
>
> I may perhaps be permitted to recall a forgotten experiment, which nearly a quarter of a century ago I showed at the London Institution, an experiment simple enough in itself, but which then seemed to me important from the consequences to be deduced from it, and the importance of which will be much better appreciated now than then.
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> A train of multiplying wheels ended with a small metallic wheel, which, when the train was put in motion, revolved with extreme rapidity against the periphery of the next wheel, a wooden one. In the metallic wheel was placed a small piece of phosphorus, and as long as the wheels revolved, the phosphorus remained unchanged; but the moment the last wheel was stopped by moving a small lever attached to it, the phosphorus burst into flame. My object was to show that while motion of the mass continued, heat was not generated; but when this was arrested, the force continuing to operate, the motion of the mass became heat in the particles. The

experiment differed from that of Rumford's cannon boring and Davy's friction of ice, in showing that there was no heat while the motion was unresisted, but that the heat was in some way dependent on the motion being impeded or arrested. We have now become so accustomed to this view, that whenever we find motion resisted, we look to heat, electricity, or some other force, as the necessary and inevitable result.

It would be out of place here, and treating of matters too familiar to the bulk of my audience, to trace how, by the labours of Oersted, Seebeck, Faraday, Talbot, Daguerre, and others, the way has been prepared for the generalization now known as the correlation of forces or conservation of energy, while Davy, Rumford, Seguin, Mayer, Joule, Helmholtz, Thomson, and others (among whom I would not name myself, were it not that I may be misunderstood and supposed to have abandoned all claim to a share in the initiation of this, as I believe, important generalization) have carried on the work; and how, sometimes by independent and, as is commonly the case, nearly simultaneous deductions, sometimes by progressive and accumulated discoveries, the doctrine of the reciprocal interaction of the quantitative relation, and of the necessary dependence of all the forces, has, I think I may venture to say, been established.

If magnetism be, as it is proved to be, connected with the other forces or affections of matter, if electrical currents always produce, as they are proved to do, lines of magnetic force at right angles to their lines of action, magnetism must be cosmical, for where there is heat and light, there is electricity, and consequently magnetism. Magnetism, then, must be cosmical, and not merely terrestrial. Could we trace magnetism in other planets and suns as a force manifested in axial or meridional lines (*i.e.*, in lines cutting at right angles the curves formed by their rotation round an axis), it would be a great step; but it is one hitherto unaccomplished. The apparent coincidences between the maxima and minima of solar spots, and the decennial or undecennial periods of terrestrial magnetic intensity, though only empirical at present, might tend to lead us to a knowledge of the connection we are seeking; and the President of the Royal Society considers that an additional epoch of coincidence has arrived, making the fourth decennial period; but some doubt is thrown upon these coincidences by the magnetic observations made at Greenwich Observatory. In a paper published in the "Transactions of the Royal Society," 1863, the Astronomer-Royal says, speaking of results extending over seventeen years, there is no appearance of decennial cycle in the recurrence of great magnetic disturbances; and Mr. Glashier last year, in the Physical Section of this Association, stated that, after persevering examination, he had been unable to trace any connection between the magnesium of the earth and the spots on the sun.

Mr. Airy, however, in a more recent paper, suggests that currents of magnetic force having reference to the solar hour are detected, and seem to produce vortices or circular disturbances, and he invites further co-operative observation on the subject, one of the highest interest, but at present remaining in great obscurity.

One of the most startling suggestions as to the consequence resulting from the dynamical theory of heat is that made by Mayer, that by the loss of *vis viva* occasioned by friction of the tidal waves, as well as by their forming, as it were, a drag upon the earth's rotatory movement, the velocity of the earth's rotation must be gradually diminishing, and that thus, unless some undiscovered compensatory action exist, this rotation must ultimately cease, and changes hardly calculable take place in the solar system.

Assuming the undulatory theory of light to be true, and that the motion which constitutes light is transmitted across the interplanetary spaces by a highly elastic ether, then, unless this motion is confined to one direction, unless there be no interference, unless there be no viscosity, as it is now termed, in the medium, and consequently no friction, light must lose something in its progress from distant luminous bodies; that is to say, must lose something as light; for, as all reflecting minds are now convinced that force cannot be annihilated, the force is not lost, but its mode of action is changed. If light, then, is lost as light (and the observations of Struvè seem to show this to be so; that, in fact, a star may be so far distant that it can never be seen in consequence of its luminous emissions becoming extinct), what becomes of the transmitted force lost as light, but existing in some other form? So with heat: our sun, our earth, and planets are constantly radiating heat into space, so in all probability are the other suns, the stars and their attendant planets. What becomes of the heat thus radiated into space? If the universe have no limit—and it is difficult to conceive one—there is a constant evolution of heat and light; and yet more is given off than is received by each cosmical body, for otherwise night would be as light and as warm as day. What becomes of the enormous force thus apparently non-recurrent in the same form? Does it return as palpable motion? Does it move or contribute to move suns and planets? and can it be conceived as a force similar to that which Newton speculated on as universally repulsive and capable of being substituted for universal attraction? We are in no position at present to answer such questions as these; but I know of no problem in celestial dynamics more deeply interesting than this, that we may be no further removed from its solution than the predecessors of Newton were from the simple dynamical relation of matter to matter which that potent intellect detected and demonstrated.

The Soirees.

On no former occasion have the members of the Association been entertained at soirées in which combination of effects was so perfect in all respects. The exhibition building consisting of a noble hall, upwards of two hundred feet in length, with a fine gallery running round, was well adorned with objects of art and illustrations of science in various departments. An excellent collection of paintings were aided by photographs in covering the walls, both in the gallery and the lower part of the building. The energy of the honorary local secretaries in securing such a collection in such a short time is beyond all praise. No public invitation to contributors was made; the whole collection being the result of private application. The collection of photographs was exceedingly interesting. By "especial desire," Mr. Robinson sent his admirable compositions, "Bringing Home the May," "Autumn," and some others, which were the subjects of universal admiration. Mr. Swan's examples of carbon printing excited equal surprise and delight by thei exquisite delicacy and fine tone. Mr. Claudet exhibited a large number of his well-known fine portraits. Mr. Rejlander's very beautiful figure-studies excited much attention. Mr. Thompson's very fine views of ruined temples in Cambodia were examined with eager interest. Mr. H. Cooper's well-known artistic character renderings, Mr. Ernest Edwards' noble examples of portraiture, and those of Maull and Co., all received the attention which might be anticipated. Mr. Whitlock, of Birmingham, exhibited a fine combination group of the chief members present at the Birmingham meeting last year. Mr. Spiller, Mr. V. Heath, and some other metropolitan photographers sent good examples of the products of the art. Mr. Arthur Green exhibited some photographs of scenes in the neighbourhood of Cape Town. Some good examples of photo-zincography by Col. Sir H. James were exhibited. Amongst local photographers who contributed good work, we may mention the names of Messrs. Cox, Woodward and Co., Spencer, Burton and Sons, and others. Mr. How exhibited his tent, some fine micro-photographs, &c.; and Mr. Ackland exhibited a remarkably valuable and ingenious dividing engine he has recently invented, which, although not photographic, we mention because we believe it will bring fame and profit to a gentleman to whom photographers are much indebted.

Perhaps the most novel and interesting feature of the evening was the illumination of the refreshment pavilion by means of the magnesium light. This refreshment room was a scene of rare and unique beauty; an immense pavilion, forming two crescents, beautifully filled as a winter garden with beautiful flowers and plants, beautiful arrangements of rockery, magnificent ferns, artificial cascades, abundance of varied refreshments, in which choice fruits formed an important feature—all this, with its living tide of "beauty and chivalry," illuminated by the brilliant light from two of Mr. Larkins' lamps, described on another page, in which a perfect and continuous light for upwards of three hours contributed to render the scene one of great attraction. On the second occasion of the soirée, the dazzling white light of the magnesium, slightly inclining to blue, which produced an effect of colour on some complexions slightly ghastly, was modified by a slight admixture of nitrate of strontium, which gave the flame a more rosy hue. Altogether, the soirées and the light were signally successful.

The Sections.

In the various sections there was a general dearth of matters of especial photographic interest. Mr. Claudet's paper and the discussion are given elsewhere. On a subsequent day Mr. Claudet exhibited and explained a diaphragm which could be expanded or contracted during exposure by twisting the tube, and also explained a method of looking through one large lens at a stereoscopic slide so as to secure relief; the plan in question consisting in converging the axes of the eyes so as to cause the rays to cross; in short, to squint through the lens. Mr. Larkin gave a description of the magnesium light which appears on another page. Mr. J. T. Taylor read a paper "On a Defect in the Demonstrating Polariscope," which will appear in our next. Mr. Thompson read a paper on a Visit to Cambodia, a remote country between Siam and Cochin China, during which he photographed some extraordinary and interesting ruined temples in the heart of a vast forest. The photography, executed under unusual difficulties in this remote region in tropical climate, by the wet process, was exceedingly perfect, delicate, and soft, as were also some fine portrait photographs illustrating ethnological types. These photographs will, we believe, be published in London. We shall probably, on a future occasion, have a few words on Mr. Thompson's experience in photographing in the tropics.

Excursions to the various scenes of historic, scientific, and commercial interest, within easy distance of Nottingham, concerts, floral fêtes, all aided in giving a joyous character to this annual gathering, which forms a philosophers' holiday as well as parliament of science.

FOREIGN PHOTOGRAPHIC MISCELLANEA.

At the last meeting of the French Photographic Society, M. Maxwell Lyte communicated the following receipt for making a photographic varnish which he has employed with great success. Some amber of ordinary quality is put into a flask with just enough chloroform to moisten it When the amber is become soft, sufficient benzole is added to dissolve it, and a very transparent varnish is thus obtained. If it is required to give the varnish a little more body, the addition of half per cent. by weight of gum dammar is recommended; but on no account should a larger quantity be added, since the varnish is then apt to become sticky when warmed.

M. de Constant Delessert made some observations with reference to the so-called Magic Photographs.

The June number of the *Bulletin* gave an account of the process by which these amusing toys are produced. Although these pictures can scarcely be considered scientific novelties, still the means employed for obtaining them is a matter of some little interest, and it is rather curious, that while German journals contained an account of their manufacture at the time of their first appearing before the public, in Paris the mode of their preparation has remained a wonderful mystery.

Professor Schnauss, in publishing the method generally used for producing these invisible pictures, does not forget to warn the public of their dangerous character, owing to the bichloride of mercury used in their preparation. This warning was all the more required, inasmuch as these pictures are often placed in the hands of children totally ignorant of their poisonous nature.

The method of producing them is as follows:—Pictures are deeply printed on ordinary albumenized or salted paper, washed, and, without being toned or fixed, put into a saturated solution of bichloride of mercury. In twenty minutes or half an hour the pictures will totally disappear, when they are thoroughly washed and hung up to dry. White filtering-paper, of the ordinary thickness, impregnated with a saturated solution of hyposulphite of soda and dried, serves as a developer: on placing the filtering paper in contact with the invisible picture and dipping them into water, the magic photograph appears. The picture thus revealed has, however, the unpleasant reddish tone due to the hyposulphite of soda. After several experiments I found that a much better tone might be obtained by using the old well-known toning and fixing bath made with gold and sulphocyanide. It is unnecessary to state that in order to have a durable picture, the print must be fixed in the ordinary manner.

The German journals give the details of a curious process by which pictures may be obtained which appear and disappear at will. For this purpose, ordinary paper, specially sized with gelatine (like the English papers), is dipped into a solution of gelatine containing 1¼ grammes of that substance dissolved in 32 cubic centimetres of warm water. The paper is then dried, and floated upon a bath composed of two parts of distilled water and one part of a saturated solution of bichromate of potash; the paper is allowed to remain in contact for four minutes, and is then dried. The paper is then marked on the wrong side, and put into a pressure-frame with the prepared side against the negative. A vigorous print is obtained, which is washed first in cold water, and subsequently in warm, to remove the gelatine. Finally, if there be still a trace of the picture remaining, it is to be dipped into a mixture of sulphuric acid and water in equal parts, and then dried. When the paper is dipped into water, a transparent picture appears, which vanishes on drying; the picture may, however, be fixed by floating it on a solution of gum arabic. Albumenized paper cannot, of course, be used for the production of these pictures, and only that sized with gelatine will answer the purpose.

M. Marion offered a few remarks on the manufacture and employment of negative paper made in endless rolls, and prepared with collodion and waxed.

On account of this paper being waxed, it will keep for any length of time, and can be safely transported to any distance. Being an endless paper, with a breadth of 57 centimetres, it may be cut into pieces of any reasonable dimensions, and will be especially useful in making enlargements. A positive photograph obtained from a negative may be reproduced in the enlarging camera as a negative, and a print obtained from the enlarged negative in an ordinary printing-frame. Of all negative processes, those conducted with paper are by far the simplest, easiest, and most durable.

M. Marion hoped that the Society might be induced to nominate a commission to enquire into the merits of this paper, more especially with regard to its sensitiveness.

The quality of the paper consists in the extreme regularity of its manufacture, the work being performed by the equal pressure and warmth of metal cylinders, and not by hand. It will be specially useful to amateur photographers. It is sensitized in the usual manner in a bath containing 7 per cent. of silver and 10 per cent. of acetic acid. The immersion of the paper in this bath, and in that of gallic acid, will at first appear somewhat difficult, on account of the repellent nature of the paper, but it is precisely this repulsive action in the paper that constitutes its quality. The paper should be forced under the liquid by means of a brush, which should be drawn over the whole of its surface till it becomes well saturated with the sensitizing or developing liquid.

The developing is effected in the usual manner, with a saturated solution of gallic acid to which is added ten drops of aceto-nitrate of silver for every 100 grammes of the liquid.

The print is washed, fixed with hyposulphite of soda, washed again, and then dried. It is finally subjected to a good heat for the purpose of melting the wax.

Cosmos publishes an account of some experiments undertaken by M. l'Abbé Laborde, "On the Continuance of Luminous Impressions." When a light is thrown upon the retina of the eye, the sensation produced remains for a short period after the ray has actually been cut off; this length of time, according to some physicians, is estimated to be about a third of a second. The Abbé has instituted some experiments to ascertain in what way successive flashes of light produced at different intervals would affect the vision, and whether, in a white light, all colours have equal powers of leaving continuous impressions, or whether the more refractable colours possessed that power to a greater degree. A slit was made in the shutter of a darkened room, three millimetres wide and six long, through which the sun's rays were reflected by means of a small mirror. A metal disc (near the edge of which perforations, corresponding in size to that in the shutter, had been made, at some distance apart) was fastened inside the darkened room against the shutter. This disc was set in motion by clockwork in such a manner as to revolve at a greater or less speed at will. The observer stations himself behind a ground glass which is placed in the track of the luminous ray, about a yard distant from the disc. When the disc commences to revolve, the ray of light is at first interrupted, but afterwards it becomes quite constant, and as the disc revolves faster the edges of the ray become tinted; as the speed progresses, the following colours appear successively: blue, green, rose, white, green, blue. If the disc is made to revolve still more rapidly after the last blue has been attained, the ray again becomes white.

The whole of the phenomena depend upon the speed at which the disc revolves.

ON THE EMPLOYMENT OF PAPER PYROXYLINE IN THE MANUFACTURE OF COLLODION.

BY DR. LIESEGANG.[*]

At a recent meeting of the Paris Photographic Society a discussion arose as to the comparative merits of cotton and paper pyroxyline in the manufacture of collodion, when some doubts were entertained as to the suitability of the paper product for that purpose. A large quantity of paper pyroxyline has been made in my laboratory at Elberfeld, and as some very successful results have been obtained with it, it would be well, perhaps, to publish a few notes, bearing upon the subject, which I have jotted down, from time to time, in my laboratory note-book.

November 1st, 1862.—A quantity of flax was saturated in a mixture composed of equal parts of nitric and sulphuric acids, the first of a specific gravity of 1·405, the latter, 1·6. The flax, after remaining in the solution for ten minutes, became quite colourless. It was then taken out, thoroughly washed, and dried. This product did not completely dissolve in a mixture of four parts of alcohol and two of ether. A few sheets of tissue-paper were allowed to remain in the same acid bath for a quarter of an hour, and then well washed and dried. On being placed in the alcohol and ether mixture, it was easily dissolved. Some sheets of white blotting-paper were treated with an acid mixture of like strength, and allowed to remain during the night. After being washed and dried, it was easily dissolved in the alcoholic mixture, but yielded a thinner collodion than the tissue-paper.

When these three samples of collodion were iodized, it was found that the one containing the tissue-paper product worked the fastest and gave the finest and most vigorous pictures.

November 5th.—30 grammes of tissue-paper were cut up into strips, and saturated for fifteen minutes in an acid bath containing 250 cubic centimetres of nitric acid, sp. gr. 1·4, and a like quantity of sulphuric acid, at a temperature of 66° C. A further quantity of tissue-paper, amounting to 15 grammes, was afterwards treated in the same acid bath; a portion of this was removed after remaining in the acid for an hour, and the remainder was left in for six days. After being washed and dried, all the samples proved to be completely soluble in the alcohol and ether mixture.

November 12th.—250 grammes of tissue-paper, cut up into strips, were saturated in an acid bath composed of two litres of nitric and two of sulphuric acid, the former of the sp. gr. 1·4. After treatment for twelve hours, the product was removed, and yielded an almost clear solution in the alcoholic-ether mixture.

The simplicity of preparing pyroxyline by this process is very evident when compared with that of producing it from cotton wool, according to the instructions given in Hardwich's Manual of Photography; and in actual practice the difference is even more manifest. In place of the time-taking operation of picking and separating the cotton wool, previous to treatment, the tissue-paper has merely to be cut into strips with an ordinary pair of scissors. Weight for weight, the paper is much less bulky than the cotton. In converting paper into pyroxyline, the temperature of the acid saturating-bath is of little consequence, and the washing and drying of the product can be effected in less time than with gun-cotton. In short, the whole process is so simple, and, at the same time, so certain in its results, that any one ignorant of chemistry may carry it out.

Paper collodion has, in many cases, been proved to be superior to gun-cotton collodion, on account of its being clearer and more fluid in its character; it forms a beautiful homogeneous film on the glass. Its keeping qualities are, at least, equal to those of gun-cotton collodion, and the pyroxyline paper itself has been preserved a lengthened period without undergoing decomposition. Owing to its very fluid character, this product is singularly adapted to the preparation of collodion destined to contain a haloid silver salt in suspension.

Lastly, paper collodion is much cheaper than that prepared from gun-cotton. The acid mixture may be used over and over again, and, in order to ascertain whether the product has been sufficiently treated, before removal from the saturating-bath, a small specimen of it (after being washed and dried) should be tested, to see whether it is soluble in the alcohol and ether mixture.

ON A NEW PROCESS FOR EQUALIZING THE DEFINITION OF ALL THE PLANES OF A SOLID FIGURE REPRESENTED IN A PHOTOGRAPHIC PICTURE:

BY A. CLAUDET, F.R.S.[*]

Mr. Claudet introduced the subject by pointing out that photography, in the representation of solid figures, failed to give a well-defined image of all the various parts situated on different planes, the best object-glasses giving a sharp image only for the plane in focus, the images of the objects situated before and behind being confused and imperfect.

To obviate this, diaphragms were used to cut off all the oblique rays, and to employ only the rays which emerge from the lens at the least angle possible. This of course was a source of loss of light and prolonged exposure and all the concomitant evils. Having pointed out these facts, he proceeded to explain the mode in which he proposed to obtain better results, and the advantages of the method proposed. We shall make extracts in his own words.

"Even supposing that the person could sit sufficiently long without moving, and preserve all the while the same expression, it is a question, not difficult to decide in an artistical point of view, whether a photographic portrait showing all the pores and asperities of the skin, with the smallest of its wrinkles, would ever be an agreeable or artistic production.

"Excessive minuteness is the greatest reproach which has been made by artists to the best photographic portraiture; and in order to obviate it, some have gone so far as to suggest that it would be desirable that photographers should take their portraits *a little out of focus.* But these artists, forgetting certain laws of optics, failed to observe that it was impossible to represent the whole of the figure in *the same degree* out of focus. If, for example, the nose was a little out of focus, the eyes would be considerably more so, and the ear still more; in fact, some parts of the figure would be quite indistinct and confused, whilst one part only would be a little softened down by a slight deviation from the plane of sharp focus.

"Convinced, myself, of the advantage which, in an artistical point of view, would result from photographic portraits being taken in such a manner that they should as much as possible resemble a work of art, in which all the features are marked by light touches of the brush or pencil, softly blending from light to shade, such an important subject has for a long time occupied my attention. My precise object has been to discover a method of removing, if possible, from photographic portraiture that mechanical harshness which is due to the action of the most perfect lenses.

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[*] *Photographisches Archiv.*

[*] Read at the British Association, Nottingham Meeting, 1866.

"In the best works of art, all the effects are produced by a soft and harmonious treatment; nothing is hard or dry, nothing is too minutely delineated: in fact, the hand of the artist is not capable of microscopic correctness—and fortunately so, for its work is not intended to be examined by a magnifying lens; still the general effect may be sufficiently minute for the artistic purpose.

"Notwithstanding its defects, photography is the great teacher to artists: they find in it the true reflex of nature; it shows the correct distribution of light and shade, with all its delicate half-tints; its perspective drawings are perfect, and it represents the folds and texture of draperies in the most exquisite manner. But if art derives a great advantage from the imitation of photographic productions, art is in its turn a very competent and valuable teacher of photographers. Their works indeed have no value if they do not partake of a certain character which distinguishes the best works of art. And therefore photographers must not despise the recommendations of true artists; for in trying to imitate art they will often improve their own productions. Therefore, as artists have nothing better to do than to imitate photography, so photography has nothing better to do than to be guided by art.

"By the laws which regulate the action of lenses, it happens, as has been already pointed out, that in the representation of a solid figure there is strictly only one plane of that solid which can be taken in perfect focus. The image, therefore, of that plane is not in harmony with the images of the other planes, which are not so sharply defined. This inequality in the texture of the image cannot but be considered a defect; and it would be a great advantage if it were possible to equalize the effect, even at the cost of losing the mathematical accuracy of the plane in focus. I hope to show, indeed, that such a loss would be really a considerable gain. If photographic portraits should not exhibit all the pores, wrinkles, and defects of the skin, it is still less desirable that only one part of the face should be in that condition, while all the others should gradually lose their sharpness as they are more and more distant from the plane of definition.

"We can, at will, bring the focus upon any plane of the figure. In taking portraits not smaller than miniature size, we may choose the nose, the eyes, or the ears; but we cannot have the three equally sharply defined; and photographers endeavour to focus upon a middle plane—for example, upon the eyes—in order to have the nose and the ears in the same degree of less perfect definition, not very far from that of the eyes.

"Perfection in the portrait would be attained—were it possible to do so—first, by taking the image of the nose; then, after having altered the focus, the image of the eyes; and finally, after again altering the focus, the image of the ear; and then, from these various images, forming a collective portrait. Such an idea may appear impracticable, possibly even absurd, and it is sure on first thoughts to be rejected and condemned. Yet I seriously, and after mature consideration both of the practice and of the theory of such a scheme, propose its adoption as one of the greatest improvements which will have been introduced in photography since its discovery. I beg to be allowed to explain the method in which I conceive I have solved the difficulty I have above alluded to.

"My focimeter, a model of which is on the table, is made of eight separate segments of a disk, mounted spirally on a horizontal axis of 12 inches, corresponding with the optical axis of the lens; the segments are all separated, and distant about 1½ inch from each other. In a front view, they form on the ground glass the image of a complete and regular disk. The segments are covered with some uniform and well-defined devices; and the centre of each is marked with its number, from 1 to 8. The first segment is the nearest, and the last the furthest, from the lens.

"By moving slightly and slowly forward and backward the focussing or ground glass, any one of these segments, and all in succession, may be brought into focus. If we focus upon No. 4, for example, we see that the segments before and behind gradually lose their sharpness, in a greater or less degree, according to the quality of the lens; and from that experiment we may judge empirically of what is called the depth of focus of the lens. By comparing at the same time the photographic image with the image we had on the ground glass, we see, if the visual and chemical foci agree, to what extent they differ. But our present object not being to test whether the chemical and visual foci agree, we will take a lens in which we know that they coincide.

"Now, supposing that we focus upon No. 1, we shall find that the photographic image of that segment will be very well defined, No. 2 a little less, No. 3 and all the others until No. 8 gradually losing their sharpness, so that No. 8 will be the most indistinct. In the same way, if we take a portrait so that the nose is on the plane of No. 1, this part of the face will be well defined; the eyes, which are on the plane of No. 2, will be a little less well defined; the ear, on the plane of No. 3, still less defined; and if the body is obliquely turned, the shoulder, which corresponds with the plane of No. 8, will be considerably confused.

"Experimenting again upon the focimeter, let us suppose that after having operated with No. 1 in focus, we move the frame holding the plate to a point previously marked on the camera-board where No. 8 is in perfect focus. If we then expose the plate a second time, or rather continue the exposure, we shall find that upon the first confused image of No. 8 a new image, well defined, has been impressed, and at the same time a confused image of No. 1 will have been impressed upon the first image of No. 1, which was well defined.

"In examining the result, we shall find it better than if the second impression on both segments, No. 1 and No. 8, had not been taken. In the middle of a confused image of No. 1 and No. 8 we shall have one perfectly defined, the whole having the appearance of the shadow of a pin not quite in contact with the surface; that shadow being slightly blended from dark to light, but still sufficiently defined to show the exact form and size of the pin.

"Now what has been done for the two extreme segments of the focimeter Nos. 1 and 8, can consecutively be done for the intermediate segments Nos. 2, 3, 4, 5, 6, 7, and 8; and in fact, it is unavoidably done during the movement of the plate from No. 1 to No. 8; and the result is, that every segment has the image of any small spot delineated upon it as if that spot was seen through a thin vapour.

"This being well understood, let us apply the same mode of operating to the taking of a portrait; and while the person is sitting, let us move the frame holding the plate from the point of the focus of the nose to the focus of the furthest point of the figure. It is evident that during the movement of the plate the various planes of the figure will have been consecutively *in* focus and *out* of focus during one part of the exposure, and all in the same degree. Thus we have by a very simple contrivance found the means to realize the wish of true artists, viz., to take a photographic portrait without hard lines, but with the light and shades blended in the most artistic harmony.

"We now arrive at the most important part of the discovery. The result may be obtained in greater perfection without having to move the frame holding the plate in order to adapt it consecutively to the focus of each of the planes of the figure. In moving the frame, it is evident that in one direction we increase, and in the other we reduce, the size of those parts of the image which are consecutively brought into focus. The result is to exhibit, more conspicuously than when these parts were out of focus, the exaggeration of perspective which is inherent to all photographic representations taken by lenses not very distant from the figure—an exaggeration, I may remark, so disagreeably apparent in all large portraits taken by too short-focus lenses. To obviate this increase or reduction of the size of the image of the various planes of the figure, it would be necessary, if this were practicable, during the operation to change the lens, and rapidly to substitute another, having a focus appropriate to the distance of the new plane, without altering the distance of the plate, so that the plate should not have to be moved forward or backward for the adaptation of the various foci according to each distance of plane.

"It happens, fortunately, that this change of foci may be effected with the same object-glass when that object-glass is a double combination of lenses. The focus and power of such double combination being the result of the distance which separates the two lenses, it may be increased or reduced merely by altering that distance. Now if, during the operation, we bring nearer or further the two lenses, by this simple means we adapt the focus of every plane to the immovable frame holding the plate; and we are enabled thus to represent consecutively on the plate an image of every plane, with a less reduction or increase of size than when the power of the double combination remains the same; for it happens, fortunately, that, to reduce the focus, we must separate the lenses, by which the power is increased. The alteration of the distance which separates the two lenses is effected by a rack and pinion acting upon a tube containing the back lens, that tube sliding into another containing the front lens, which remains fixed during the adaptation of the focus to the distance of every plane by means of a gradual movement communicated to the back lens during the sitting. The inspection of the apparatus, which I submit to the meeting, will enable any visitor interested in the question to understand its action.

"It is marvellous when we reflect that there is nothing to wish for in the shape of contrivances having for their object the perception of vision, and that from time to time man invents, or thinks he invents, what nature had done in the most perfect manner. The eye is supplied with a lens in the same way as the camera obscura; the retina is the screen on which, like the ground glass of the camera, the light reflected by all the natural objects form their image. By various humours through which the light is refracted, the spherical aberration is corrected, and the most perfect achromatism is produced; the eye is endowed with muscles which enable it to alter the focal distance of the lens according to the various distances of the objects. Optics is able to imitate all these beautiful contrivances except the last, which is available only on account of the way in which we exercise the perception of vision. We see at once only a very small part of the image—that part which is projected on the centre of the retina; and the eye can adapt its focus to the distance of that part, and, as rapidly as thought, when directing its attention to another part, it adapts its focus to that new distance. Therefore, it matters not whether the other parts are in focus; we have only the perception of what we want to see, and, by the proper adaptation, that sensation conveys to our mind only a well-defined image. It cannot be so with the camera obscura, because, the photographic image produced by it being at once permanently fixed entire by the same exposure, we cannot change it in changing the focus; the only thing we can do is to impress a stronger image on a fainter image. The artificial optical instrument, being destitute of a self-acting changing adaption to the focus of all the other planes, can represent only one plane *in focus*; but if it had that adaptation, the surface receiving the impression of the image in a permanent manner (not like the retina, which does not retain the impression), that impression would consist of a number of images superposed one upon another. For this reason nobody would ever have thought of proposing to employ a lens which, moving during the exposure, would adapt itself consecutively to the foci of all the other planes of the image. But from the fact that the eye can easily and usefully alter its focus according to the distance of the plane it wants to examine, and unconsciously discard the image of the other planes while they are out of focus, it is possible to learn what may be a very useful modification of the artificial optical instrument called the camera obscura. If we cannot discard the superposed images out of focus, and see only among them the one in focus, it happens fortunately that the image in focus is stronger, better defined, and consequently more conspicuous than all the others. If we cannot discard entirely the images out of focus, they at all events appear only like a number of blended shades of the principal image. Therefore, in this process for changing the power and the focus of the double combination of lenses according to the distance of the various planes, we do nothing but imitate one of the most beautiful and indispensable of natural contrivances, by which the eye is so wonderfully well calculated to perform all the exigencies of perfect vision, and is one of the most marvellous and splendid works of the Creator.

"One of the great advantages of the method I have described is, that the various planes of the figure are represented with the same intensity of light, which is not the case when the rays are more condensed on the plane of exact focus than on the other planes. For it is obvious that the difference of intensities of light on the various planes produces an unnatural effect, and destroys so far the harmony of the picture.

"I have felt justified in bringing this matter before the Association, from the confident hope that, by the examination of scientific photographers, a new era may henceforth begin in the art of photography. If the plan I propose is, in its present state, deficient in many practical points, as must be the case in almost all new inventions, I am sure that, with the co-operation of so many ingenious and active minds which are constantly engaged in the task of progress, the science of optics will be able to supply photographers with a camera obscura which, in its working, will approach as near as an artificial instrument can approach the beautiful instrument which gives to man the most perfect perception of all the wonders and beauties of nature."

At the conclusion of Mr. Claudet's paper, which was illustrated by reference to the focimeter, and by a number of portraits in which the same head was rendered in perfect focus on one plane, and by means of the movement proposed by Mr. Claudet,

The CHAIRMAN expressed a high opinion of the importance of the question, and an approval of the means proposed to effect a distribution of focus. He remarked that the movement of one of the lenses of the combination through a space probably not exceeding the twentieth part of an inch would have the effect of giving a succession of perfect images superposed upon a succession of imperfect images, the effect of the latter being to soften or shade off the hardness of the others, and thus produce a more artistic and harmonious result.

Mr. J. TRAIL TAYLOR said that the end proposed by Mr Claudet was very desirable; and whilst every suggestion he made as to the mode of securing that end would be received with due deference, it might be questioned whether the same end might not be secured by what might be termed legitimate optical means. This had, indeed, been already attempted with considerable success by one of our most eminent metropolitan, or, indeed, he might say European, opticians, an example of which he placed in the hands of the Chairman.* By retaining in the construction of the lens a certain amount of aberration, the focus was distributed, the hardness arising from excessive sharpness on one plane was avoided, but every part required to be in focus was sufficiently defined for pictorial purposes. He might mention that many years ago Mr. Talbot aimed at softening the effect of extreme sharpness, by printing through a piece of semi-transparent paper, with good effect. On the question of the variation of the chemical and visual foci, he remembered that Professor Piazzi Smythe had examined the same question, and found a decided variation in the effect of morning and evening light. Mr. Taylor, in speaking of the lens by which the print he exhibited was produced, said it had another advantage: whilst with full aperture it possessed sufficient aberration (intentionally introduced) to give softness and depth, on introducing a stop which cut off the marginal rays, this aberration was removed, and the lens became sufficiently sharp for purposes requiring more perfect definition. He added, in answer to a question, that it was made by Mr. Dallmeyer, and was a modification of his well-known triple lens.

The PRESIDENT thought it would not be possible with a lens of fixed focus to equalize the definition through several planes. Some parts of the print exhibited were out of focus.

Mr. TAYLOR said that in the print he exhibited the background was out of focus purposely, but the distribution of focus was effected for every plane in which it was desired; all the portions requiring definition were sufficiently defined, but there was an entire absence of hardness.

Mr. BROOKE expressed a conviction that the effect produced by Mr. Claudet could not be obtained by a lens with a fixed focus without using a very small aperture.

Mr. GLAISHER said he would be glad to accompany Mr. Taylor at any time to see the performance of such a lens as he described. He was much interested in Mr. Claudet's improvement, and had devoted some hours to its examination, sitting himself in various positions which would severely test the principle, placing his hand in position at least two feet from his head; nevertheless, each was sufficiently defined, but without hardness. Besides this, the whole picture was in better proportion and more perfectly harmonious. Another point of some importance was, that with such a resource it would be of less importance to use the most perfectly corrected lenses, and what might be termed a bad lens might be made to do satisfactory work when Mr. Claudet's plan was adopted.

Mr. G. WHARTON SIMPSON said he was sure that every one interested in photography would hail with gladness any proposition like that of Mr. Claudet, in which he aimed to remove from photography one of its standing reproaches—namely, that whilst it gave extreme sharpness on one plane, rendering with painful minuteness, freckles, wrinkles, and rugose texture, it at the same time left the nose, ears, and other parts very imperfectly defined indeed. The plan Mr. Claudet proposed would doubtless effect a great improvement in this respect, as his example illustrated. He, in effect, proposed, in depicting a large head, to use a soft, blunt crayon instead of a fine-pointed steel pen. But whilst admitting this, he could not but think that the method to which Mr. Taylor had referred, had not been sufficiently understood or considered. It was one deserving of serious attention, and should not be hastily condemned or disregarded. Whilst it was perfectly clear that a lens which had a fixed or definite focus could not define on one plane an object having several planes, yet, by depriving the lens of a definite focus, and leaving a certain amount of positive spherical aberration, it had been practically demonstrated that a sufficient amount of definition might be distributed over several planes. Such a method was, for certain work, evidently desirable, and was well worthy, he thought, of the attention of opticians. Regarding the variation at different times between the chemical and optical foci of lenses, he should like to ask Mr. Claudet whether he had observed carefully if this variation was due to atmospheric conditions or to temperature. An achromatic lens being constructed of two kinds of glass of a different density, the refractive power of each would be differently affected by the expansion due to variation of temperature, and a lens corrected for a temperature of 60° would be imperfectly corrected at a temperature of 80°.

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* The print in question was one of Mr. H. P. Robinson's, named "Waiting for the Boat," 16 by 12 in size.

Mr. **Claudet** said it might be both. Temperature probably affected the question somewhat, but he thought more was due to atmospheric conditions altering the quality of the light.

Mr. **Brooke** made some remarks in which he expressed a conviction that the variation was due to atmospheric conditions; and after a vote of thanks to Mr. Claudet, and a request from the Chairman that Mr. Taylor would exhibit the photograph he had shown, which was very beautiful, at the soirée, the discussion terminated.

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ON THE ACTION OF LIGHT UPON IODIDES.

BY M. POITEVIN.*

The supporters of the theory that iodide of silver undergoes a physical change when exposed to the action of light, have advanced from time to time many different opinions in support of their views; either that the molecules are influenced in some way by electricity or magnetism, or that they have the power of retaining a certain amount of light within themselves. Others, again, put forth no definite opinions, but confine themselves to the invention of problems to be solved by their adversaries.

The advocates of the theory that a chemical change takes place give but one explanation of the matter, viz., that the action of light disengages a portion of the iodine, and a sub-iodide is accordingly formed.

Nothing can be said in regard to the supposed physical action, and those who believe in it have hitherto relied upon the fact that their adversaries were unable to prove conclusively that an elimination of iodine takes place. In support of the chemical theory it may be stated, that light has an analogous action on other silver compounds, as also that the indispensable presence of certain bodies is necessary in order that the action of light may be produced, such as nitrate of silver, tannin, gallic and pyrogallic acid, sulphate of iron, &c. All these compounds; which may be termed sensitizers, possess the power of combining themselves with the iodine, and thus facilitating the action of light upon the iodide of silver.

We have no facts whatever to support the theory that a physical change occurs, whereas the chemical action may easily be explained. An elimination of iodine from the iodide of silver is caused either by the action of light, electricity, or pressure (all of which are equally productive of chemical as of physical results), and this iodine escapes into the atmosphere, or becomes absorbed by a substance in its vicinity, and there remains a sub-iodide of silver, capable of being acted upon or reduced by certain developing solutions.

In this communication I trust to be able to prove that the iodine is disengaged during the photographic exposure, and that one equivalent of iodide of silver produces two equivalents of sub-iodide, if the sensitizer is nitrate of silver or a salt decomposible by iodine, or only one equivalent of sub-iodide if the sensitizer is a body capable of combining itself with the half equivalent of iodine disengaged.

My experiments have been carried on with films of iodide of silver fixed upon glass plates by means of collodion, a substance exerting, as I pointed out some time since, no influence whatever upon silver salts.

Four different methods may be adopted to produce the iodide film :—

1. By means of iodised collodion and a bath of nitrate of silver or any other soluble salt of that metal.
2. With nitrated collodion and a solution of iodine in alcohol very much diluted with water.
3. By dissolving iodide of silver in a solution of cyanide of potassium, and precipitating the iodide by a soluble metallic salt; as, for instance, nitrate or acetate of lead.
4. By the first or second method, and subsequently treating the film of iodide with an excess of iodide of potassium.

If produced by the first method, the film is of course sensitive to light, and an impression will appear on application of the usual developer. The film produced by the second method is not sensitive to light as long as there is any of the iodine solution present, but it will become sensitive as soon as this has been removed by washing. This iodide may, I think, be considered as a pure iodide of silver. In the third and fourth methods, the iodide films are not sensitive to light, and only become so in the presence of, or in contact with, one of the sensitizers previously mentioned, as will be demonstrated below.

In previous investigations, which have since been confirmed by a foreign chemist, I only experimented with iodide of silver produced by the first, third, and fourth methods, and I have never advanced the theory, which has been attributed to me, that pure iodide of silver (uncombined with an insoluble medium, having no chemical affinity for iodine) was insensitive to light.

The following results were furnished by my experiments :—

1. A film of iodide of silver, attached to a glass plate by collodion, was placed in contact with a Daguerreotype plate, and exposed to light in a camera.
2. Another similar film of iodide of silver was placed in contact with a film of dried collodion, impregnated with nitrate of silver, and exposed in the same manner.

In both cases, on submitting the films of iodide of silver to the action of a developer (a solution of pyrogallic acid and nitrate of silver), a photographic image was obtained on those parts acted upon by the light; the contact of the silver surface in the first experiment, and that of the nitrate of silver film in the second, having rendered the iodide sensitive to light. In continuing the experiments, I submitted the Daguerreotype plate, and the nitrate of silver film likewise, to the action of the developer, and, as I had expected, a photographic image was discovered on each of them. As neither the insensitive iodide, the silver plate, nor the nitrate of silver film, when exposed separately to the action of light, had the power of receiving an impression capable of development by any known method, a new compound must, therefore, have been formed by the action of light upon the iodide of silver. The two surfaces in contact, having undergone no material alteration after exposure to light, and the iodine being the only substance capable of passing from one body to the other, another iodide must have been formed containing but half the quantity of iodine included in the original iodide. This, therefore, must necessarily be a sub-iodide of silver. As a proof that iodide of silver may be formed under these circumstances upon sensitive plates, the film of insensitive iodide of silver may be replaced by a film of simply iodised collodion, when a photographic image will be produced on the second surface as in the previous instances; in this case the alkaline iodide has been decomposed by the light, and the iodine has formed on the surface in contact a sub-iodide of silver.

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* Read before the French Photographic Society.

While proving that the silver compound, which thus has the property of receiving a photographic image capable of being developed, is a sub-iodide of silver, I do not by any means affirm that it still remains in that state after being subjected to the action of light, as experience proves quite the contrary. At the same time, we must admit that iodine is disengaged when a sub-iodide is formed, as proved by my second experiment with the iodide of silver. In the case of over-exposure, the image is said to have been burned, and the developer fails to act. This happens in white light, or in the yellow and red lights which succeed it; blue rays never effect the decomposition of the sub-iodide. I have had occasion to remark similar results with other compounds sensitive to light; as, for instance, with a mixture of perchloride of iron and tartaric acid.

The results thus obtained, which are of a purely theoretical character, could probably be made use of in actual practice. By the above methods it is possible to obtain a photographic image on a dry film of iodide of silver, which is sensitized by contact at the time of its exposure in the camera. My experiments prove that the best sensitizer is a silver salt decomposable by iodine, which produces upon the plate two equivalents of sub-iodide, whereas with tannin and other similar sensitizers only one equivalent evidently is formed. Our daily experience greatly favours this opinion, as it is well known that only half the time required to develop an iodide of silver film sensitized with tannin, is sufficient for one sensitized with nitrate of silver. In order to work rapidly with the dry collodion process, a compound or silver salt is required, which acts very gradually upon the iodide of silver film. It ought not to be difficult to discover such a substance.

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NOTE ON THE SENSITIVENESS OF IODIDE OF LEAD TO THE ACTION OF LIGHT.

BY M. SCHMIDT.[*]

The following conclusions have been arrived at by experimenting with paper coated with a mixture of iodide of lead and starch:—

1. The iodide, when in a perfectly dry condition, remains unaltered when exposed to the action of light.

2. When kept in a moist state, it is decomposed by light.

3. In order to effect its decomposition, the iodide must remain in contact with the atmosphere. Iodide of lead mixed with starch, or an alcoholic solution of gum guaiacum, remains perfectly unaltered when exposed to light in vacuo, but changes to a bluish colour immediately the air is admitted.

4. Pure iodide of lead in a moist state becomes decomposed in appreciable quantities by time; it assumes a more transparent colour, and loses its iodine, being converted into peroxide and carbonate.

5. The starch may be replaced by any other substance having a tendency to unite with iodine.

6. A mixture of iodide and starch remains unaltered in diffused light, but becomes of a dark blue colour when exposed to the direct rays of the sun.

Chloride of lead is not affected in any way by exposure to light.

PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

[The following article appeared in the *Daily Telegraph* a few days ago. Whilst agreeing heartily in its condemnation of photographic piracy, we also cordially endorse its final suggestion. We shall be glad when publishers of engravings will see their interest in effectually checking photographic piracy of their works, by publishing themselves good photographic copies, and availing themselves of this important means of popularising works of Art.]

It goes ill with the community whenever Justice appears to be anything else than what it is essentially—the best interest of everybody. Now and then it does happen that the rights of individuals and the welfare of society do not seem exactly to coincide; and, in such cases, there is nothing like a frank examination of the facts. The difficulty is illustrated by a charge brought against two dealers in photographs, who appeared on Monday at Bow Street. Messrs. Graves and Co., the printsellers of Pall Mall, own the copyright of two well-known paintings, entitled "Ordered on Foreign Service," and "A Piper and Pair of Nut-crackers." With a view to produce and sell engravings of the pictures, they had purchased them at a considerable cost. By-and-by, however, they hear that certain individuals are offering photographic copies for sale, and thereby affecting the success of the undertaking. Under the 25th and 26th of Victoria, it is a clear case of poaching on the publishers' preserves, and accordingly steps are taken to ensnare the culprits. The first, a dealer in Endell Street, sold to the agent of the Messrs. Graves specimens of the copies in question, volunteering the information, at the same time, that they were illicit goods, and could be supplied only at great risk of the vendor. Before the magistrate, therefore, the guilty photographer could offer no defence; and hence, while the remaining prints were confiscated, he was fined £10 for each of the seven sales effected, besides 23s. for costs. At the request of the publishers themselves, however, the heavy penalty was, in this instance, not exacted, because the culprit had been convicted for the first time. The second case was more unpardonable, since the offender, a photographer in High Holborn, had been cautioned again and again. Like his fellow in guilt, he readily fell into the trap laid by the Messrs. Graves. Selling to an assistant of that firm similar piracies, he told him that 12s. 6d. might be asked for a copy bought at a cost of 3s. 6d., as the "risk was great;" and he innocently advised his disguised accuser to be very careful as to customers. Here, again, there could be no defence; the guilt was confessed and palpable; the man was taken, so to speak, "red-handed," and the magistrate sternly imposed the full penalty of thirty-five pounds, besides costs, exacting it "to the uttermost farthing."

Against the propriety of these heavy sentences we have assuredly nothing to say. Both the defendants had been carrying on a trade which they knew to be illegal. But the matter is not at all satisfactorily settled because these unlucky dealers have disgorged their gains, and the Messrs. Graves have gone home to burn the photographs. Here are two charming, and, in their way, perfect works of art, which every man of taste and thought would like to see scattered broadcast through the land. The figure-piece presents a touching yet manly subject of English life—an officer ordered to the wars. Leaning from the window of the railway carriage, he is taking a farewell embrace of his gentle wife, whose pale and loving face expresses her untold dread that this may be the parting kiss of their lives. The other—the "Squirrels and Bulfinch" of Sir Edwin Landseer—was a gem of last year's exhibition. So faithful has the painter been, that the nut-brown fur seems as if you could blow it aside with the breath; while the rich soft tints of the bird's breast, swelling with song, look like nature itself. Everybody must wish that good copies of such works should be widely scattered; that they should appear on the poor man's wall, as well as in the boudoir or portfolio; in humble Dutch metal frames, as well as under gilding and glass. The colouring cannot be conveyed, of course; the engravings, however, are both singularly happy and effective; and they can be effectively reproduced by photography. But the printsellers, with their stern 25th and 26th of Victoria, come forward and protest against so cheap and delightful a dissemination of their property. They have paid certain sums of money, more or less liberal, for the copyright and the engraving; but so soon as the plate is finished, the photographers get hold of a good copy, and presently offer a capital representation for as many shillings as the print itself costs guineas. That such a practice should be punished by the printseller is natural enough, whether or not the piracies spoil the sale of his impressions. The photographer is "ploughing with his heifer," "trespassing on his manor;" he is making choice production common. His work is exactly like a Tauchnitz reprint of an English book, which we all of us buy and bring over from the Continent, although the act is wrong; and Mr. Flowers at Bow Street says very severe things about people who purchase these beautiful but wicked photographs. There is even more to be urged on the publisher's side; for without his exertions, not only the engravings, but the picture itself, might not have existed. His speculative ventures are great encouragements to art, and by his means some of the best modern works have been created and universally disseminated.

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[*] *Bibliothèque Universelle de Genève*, Juillet, 1866.

Still we look upon the law itself, and the relation it establishes between the engraver and the photographer, as positively deplorable for art education. Even a fine work will not, we admit, be a favourite with the wealthy if it be vulgarised; and we can read, from time to time, with sternly suppressed regrets, of the public destruction of some beautiful steel plate, which has been pitilessly scored with hammer and chisel that its impressions may retain their value. But while no law represses the publication of the offensive and salacious photographs with which the London shops teem, it seems a great pity that good and healthy works cannot be reproduced by the camera. The exquisite copies which can be given, and are given, for a few shillings are just the things to introduce and extend a love of real art among the poorer classes: so that a national loss is suffered if free trade be not extended into this department of industry. The only way of doing so, is to conciliate the interest of the publisher and the photographer; and we are convinced that the task is not impossible. Would it not pay the owner of the copyright and engraving, in the case of a popular picture, if he had a certain royalty upon every photographic reproduction of his work, the present penalties being enforced against any illegal publication? Connoisseurs would still purchase the larger and more direct copy, for sun pictures can never supply the place of large steel engravings. We trust, in the interests of art, that the great publishers will understand and meet in some manner the strong regrets with which the public observes these prosecutions—necessary, no doubt, but none the less unfortunate and injurious; and we would remind artists especially, that a great painting has now a double road to popularity, and that for their own sakes, when they bargain about the engraving of their works, they would do well to make some judicious and liberal arrangement for the sake of the camera.

Correspondence.

A NEW DEVELOPER.

Sir,—Following the example set by "J. M." in last Friday's News, I beg to present your readers with a formula for a new developing powder, producing rich, brilliant negatives, full of gradations. It is composed of acetate of soda and loaf sugar, crystallised together in equal quantity (the proportion is comparatively immaterial).

About eight grains of the powder may be added to each ounce of the ordinary iron developer.

Possibly some of your readers may say that this is all old. So it is, but it sells! I am, yours truly,

No Process-Monger.

CABINET PORTRAITS.

Dear Sir,—I have read, with considerable satisfaction, your article and Mr. Window's letter, in last week's News, on the new Cabinet Portraits, and entirely agree with what is there said regarding the suitability of that style of portraiture as a new fashion, calculated to give a fresh impulse to photography. I have commenced taking them myself, but make small progress with them, in consequence of their not being sufficiently general and fashionable. Persons praise them, say they are very good, &c., but they have no books to put them in, and they would not correspond with those of their friends, so that I am troubled with but few orders for them. The case would, of course, be far different were all to push them at once, and the shop windows to be full of celebrities of that size.

While entirely agreeing with Mr. Window's plan (which I heartily desire to see carried out), allow me to suggest the following as likely to assist in the achievement of the same object.

Let a meeting be convened of the principal professional photographers in the metropolis, to discuss the subject, and mutually agree to push the new size in their own establishments, to do all in their power to bring them before the public, and to adopt such other measures as such meeting might consider expedient. I believe such a proceeding would be a great assistance, and that such a meeting might be easily arranged, as, of course, it would be to the interest of all to attend. It should be the aim of photographers also to get the cabinet albums in the hands of the public, as once bought they must be filled, and with this view would suggest that they should sell them at a small profit, or even at cost price at first, even that being rather high compared with the present price of card albums, owing, of course, to the smallness of the demand for them.

Hoping, sir, that you will not let the subject drop until you have fairly set it on its legs, I remain, yours truly,

London, August 22nd, 1866. Operator.

[We fear that it will be difficult to get such a meeting of professional photographers as that suggested, but there can be no harm in anyone taking the initiative and trying. There are many things, however, which photographers can do without such a meeting. The sooner an example of the album is displayed in every specimen room, the better. If a unanimous effort be made, success, in greater or less degree, must follow.—Ed.]

Talk in the Studio.

Infringement of the Copyright Act.—Mr. Frederick Pipere and Mrs. Pipere his wife, of No. 10, Hemming's Row, St. Martin's Lane, photographers and photographic dealers, appeared before Mr. Tyrwhitt to answer summonses charging them with selling pirated copies of Sir Edwin Landseer's "Piper and Nutcrackers" and "Event in the Forest," Mr. J. C. Hook's "Egg Gatherers," and Mr. J. E. Millais' "Order of Release," the property of Messrs. Graves and Co., printsellers, No. 6, Pall Mall. There was another summons against the defendants for fraudulently issuing photographs of the "Order of Release," copied from Messrs. Graves' engravings, with Messrs. Graves' name attached, such copies having been made without their consent. Mr. Montague Williams appeared for the complainants. Mr. Pipere did not attend. The charges were proved, and the defendant threw herself on the mercy of the Court. Mr. Tyrwhitt then fined her £10 in each of the four cases, and costs. There was another summons against the defendant for copying the name of Messrs. Graves and Co. on the printed photograph of the "Order of Release." The defendant pleaded guilty. Mr. Williams said that Mr. Graves did not wish to proceed vindictively, and would consent to have one of the previous penalties reduced, in order to get a decision in this particular case. The defendant was then fined £10 and costs.

Photo. Trade Novelties.—A correspondent from one of our seaport towns writes:—An enterprising photographic hairdresser has commenced giving his male customers "a shave and their shapes" for sixpence; and to make all square with the ladies, he gives their "likeness and a box of pomatum" for the same cost, sixpence. Another tradesman in the same town, a hatter, built a glass-room in connection with his hat shop, giving every purchaser of a hat, a likeness free of cost; but as this liberality did not appear to be appreciated by the public generally, the affair fell through.

Instantaneous Photography.—The *Standard* has the following:—"On Saturday afternoon some experiments were made by Mr. Scaife, at his studio in Sussex Place, Regent's Park, in taking photograms—which is the new word used officially at South Kensington—by artificial light instantaneously. The objection to the use of magnesium wire has been that the glare of it is commonly too strong for the sitter; and although it is useful for interiors, especially where daylight never enters, it is not likely to come into general use, on account of the appreciable time that a negative requires. The plan which Mr. Scaife hopes to bring into practical working is simple enough. A plate, carefully prepared, is put into a camera; the sitter, in a partially darkened room, engages in conversation with any one, so as to secure a natural play of expression; a little powder on the pan of an ingenious lamp is set off in a puff like the flash of a charge of gunpowder, and before the sitter can wink from the effect of the sudden light, his photogram is taken. The powder is composed of certain parts of pulverised magnesium and chlorate of potash, and is set on fire by being heated by a spirit-lamp under the pan, which has a hole in it, and the light is brought into contact with the dry powder when the pan is slightly shaken by means of a wire. The pan having a reflector at the back, the light is thrown full on the sitter, and the negative is perfectly secured in about the fiftieth part of a second. Some of the negatives taken on Saturday were admirable; the expression—to catch which has been long one of the problems of photography—being remarkably good; and although one or two were below the average, this is easily accounted for by the fact that persons of dark or sunburnt complexions require to have half a grain more powder flashed than others of fairer face. It will yet need some time to develop fully the advantages of this new invention, which is, however, even in its present stage, full of interest for amateurs or artists in photography."

A Change in Style.—A correspondent says:—"Many country operators are now getting up coloured paper positives, $3\frac{1}{4}$ by $2\frac{3}{4}$, the old shilling positive style; and as there are some thousands of dozens of cases and trays on the shelves of wholesale and retail dealers, this will tend to use a large quantity of dead stock. There is a great desire on the part of the million to carry their portraits about with them. An album is inconvenient, but the shut-up case is the very thing, while those who wish to hang them up can do so in trays and frames. This arrangement will also answer well for the old quarter-case. Some years back, a Birmingham tradesman sent out "gold paper mats;" they were well got up, and would now sell extensively. I have seen many of these one-sixth and quarter-plate pictures taken on a plain resinized paper or white silk, and when judiciously coloured they look very well, and are also improved by a coating of the white shellac varnish, or the Soehnée paper varnish.

To Correspondents.

Ignoramus.—The simplest and most efficient mode of recovering the silver from old hypo is by means of liver of sulphur. If you cannot get it of a local chemist, any London, with whom you do business, will get it for you. You will find another plan, described by Herr Liebig, in our last, which you can try upon a small quantity, if you prefer to do so. 2. If your stock of washing water has run into the ground, we fear that you will have some difficulty in recovering the silver. 3. By applying Newman's "positive" colouring varnish to a paper print, which does not sensibly alter its appearance, you will produce a surface which will readily take the powder colour. M. Mansion also makes a preparation for the purpose, of which Mr. Solomon is the agent. 4. An old bath may be used for printing after neutralizing, strengthening, &c.; but the presence of iodide of silver is not favourable to the best result in printing. 5. We prefer starch to gum for mounting photographs. 6. It will be necessary to examine carefully to ascertain whether the collodion or bath is to blame for the pinholes. A newly iodized collodion, especially if a potassium iodizer be used, will sometimes produce pinholes. The presence of sulphate of silver will cause pinholes in a new bath, as will also a variety of other causes. The only practical plan in such a case is to read carefully the articles we have given from time to time, describing the different symptoms of different sources of the evil, and examine carefully the facts of your own case, exercising judgment and trying each most probable remedy, as we have given it, in succession, until the evil is got rid of. 7. For black tones, we prefer the lime toning bath. 8. Add chalk some hours or a day before using the bath. 9. The quality of the print is good, but the vignetting is a little too formal; a slightly irregular gradation, and the use of a light screen for the background, when the print is to be vignetted, will be an improvement.

D. C. L.—The lens you describe will not answer well for cabinet views. It is really only suited for covering properly a stereoscopic picture. 2. So far as we know, the copyright in the plates in "Boydell's Shakespeare, Illustrated," is expired.

Developer.—In print No. 1 the chief fault is the use of a direct front-light, which makes the face flat. In No. 2 the effect is better, the most glaring defect being the light and too definite pattern on the floor. In No. 3 the positions are awkward, the lighting the same as No. 1, and the negative a little under-exposed. No. 4 is much the best picture in the lot, and is, in many respects, very good. In No. 5 the negative is a little under-exposed; the streaks indicate that the bath is out of order. Neutralize and sun it thoroughly, filter, then add a little nitric acid, and try again. No. 6, as a photograph, is not bad; it is, however, a little under-exposed, and the position is not graceful. No. 7 is so much under-printed that it is difficult to judge of its character, but the lighting appears too directly from the front; and the negative is probably a little over-intensified. To remove the colour from your printing bath, add a few drops of a ten-grain solution of salt and water, and then filter. Mr. Window's paper on Diamond Cameo Portraits appeared in the Photographic News, No. 328. For cabinet portraits, it is probable that the lens you mention may answer moderately well. The simplest rule to adopt on the subject of price is, to make them just double the price of card portraits, giving half the number for the same sum, or the same number for double the sum.

Troubled Photo.—The yellow, faded effect of your prints is really due to sulphur, and we have no doubt is due to an action originally set up in the fixing bath. The solution has probably been somewhat exhausted, as a weak solution soon becomes, and the immersion of prints containing traces of acid, or some similar cause, has produced decomposition. The prints when first finished were probably of a rich black tint, the result of sulphur toning. Unfortunately, the black sulphide of silver, which gives such a beautiful tone, rapidly passes into the yellow sulphide, like that in the prints sent. No amount of washing will prevent this result following, if the sulphur toning action is set up in the fixing bath. Try the practice of adding a little carbonate of ammonia to your fixing bath, in the presence of which you will not have any risk of sulphur toning.

Beta.—The large vignette head enclosed is taken with a lens of much too short focus for a head of that size, and hence the two defects complained of; the nose is not only imperfectly defined, but it has the effect of being disproportionately large. The flatness is due to bad lighting more than to over-exposure. The light is directly in front of the face; and it is almost impossible to get relief with such a mode of lighting. It is also a little over-toned.

R. F.—It is very probable that waxing prints will tend to preserve them from fading, as it makes them less permeable to moisture, &c. Place a little wax on the surface, and rub it in with a clean piece of flannel. It should be done, of course, before touching out spots, &c.

M. D.—The slug-track stains are due to two or three causes. The plate has probably been kept a long time in the slide before developing, and the drainings of the plate have come into contact with the inner frame, which was not perfectly clean; the contamination spreading by capillary attraction, causes these stains when the developer is applied.

Peep-O'-Day.—We have not visited the studio in question yet, but shall probably do so shortly, and will then describe it. Mr. Hughes finds his studio answer well, and the lighting is excellent. In putting up a new studio, we should, unless special circumstances of position suggested some other course, employ the ordinary ridge-roof. Thanks: we shall be glad to have some of the prints. We prefer the warm toned example of those sent before.

G. L.—The pyroxyline you describe as giving a glutinous collodion with only three grains to the ounce of solvents has been made at too low a temperature, and probably with too weak acids. It is comparatively useless for producing photographs. It may be used for enamelling, or it may be mixed in small proportions with a very powdery sample, to give a little toughness.

E. S. H.—So far as we can judge by examination without practical tests (which, being from home, we cannot very well apply), the sample is good enough for all purposes.

Several Correspondents in our next.

Photographs Registered.

Mr. G. Bell, Carlisle,
Photograph of George Moore, Esq.
Photograph of Lord Brougham.
Mr. W. P. Carlton, Horncastle,
Photograph of the late George Gordon, of Jamaica.
Mr. H. Berlon, Bedford,
Photograph of Rev. Godfrey Clemen.
Mr. J. Hicks, Chester,
Photograph of Rev. P. Fowler.

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

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CHEAP ART AND PHOTOGRAPHIC PIRACY.

The question how far private interest should be subsidiary to public good, is one which has engaged the attention of casuists. "The greatest good for the greatest number," is assumed to be a wise motto for public policy. Carrying out the principles involved in such a statement of policy, there are those who are disposed to regard patent-rights and copyrights as barriers to progress, and who would willingly see such restrictions to free trade in ideas entirely swept away.

An able article in the *Daily Telegraph*, reproduced in our last, whilst condemning photographic piracy of works of art, expresses deep regret that such a means of popularizing art as that presented by the camera should be kept under a ban by those interested in art copyrights, and counsels print publishers themselves to issue photographs of their works as a means of subserving the public good, and maintaining their own rights and interests at the same time. In another column we print a letter from Messrs. Graves and Co., written in answer to this article. The main purport of this letter is to assert their right to conduct their own business in their own way. "We are quite at a loss," they observe, "to understand upon what principle of justice it can be argued that we are not to reap the fair fruits of our ventures in the manner which may seem best to us." As we have always given an uncompromising condemnation to piracy, and hold those who bring photography itself into disrepute by using it for dishonest purposes as in the last degree disreputable, we shall not be suspected of sympathy with piracy if we urge one or two considerations why proposals that print publishers should issue photographs of their engravings themselves should not be rejected with so much of scorn and indignation. These considerations, we may admit at the outset, are chiefly based on expediency.

In the first place, it should be remembered that their copyright in works of art is not regarded as property at common law; their right to the sole publication of any work of art is assured to them for a limited period by statute on considerations based upon the public good. If the copyright were property *per se*, it would be inalienable, and the right to possess it could not expire at the end of a limited number of years. The very fact that its possession, conferred by the statute, is only guaranteed for a short period, points out that a consideration for the public advantage is the basis of the enactment. A copyright in works of art was manifestly conferred for the "encouragement and advancement," as one of the Acts phrases it, of fine art. Since, then, the very Acts by which these gentlemen hold the property on the management of which they so emphatically claim a right to please themselves, are Acts in which the encouragement of art for the good of the public is contemplated, it might be worth while to respect the spirit of such Acts whilst claiming their protection.

It would be obviously unfair, however, to ask the publishers of engravings, even in considering the spirit of the various Copyright Acts, to trade at a loss. But here is the point in which we believe they make the greatest mistake. Many of them have regarded photography from its first advent with a jealous eye—a feeling half of fear, half of contempt, and wholly of dislike—and they have not been willing to enter into the question how far their own interests and the popularization of art might be subserved at the same time. They have regarded the multiplication of photographic copies of an engraving as deteriorating the value of the engraving. Rarity, or selectness, is undoubtedly one of the elements of value in a work of art; the limited number issued, as well as the especial beauty they possess, gives to artist's proofs an especial value. Diamonds would be comparatively valueless if they were as plentiful as blackberries. But it can scarcely be argued that this selectness or scarcity is an element in the value of an engraving, prints of which are multiplied almost *ad infinitum*. The worth of an engraving entirely depends upon its art value, and is, as a rule, not increased by accidental or extraneous circumstances. That value is not lessened by any amount of circulation or popularization. If the number of proofs and prints of any engraving issued amount to two thousand, we do not believe that one copy less would be demanded if five thousand or ten thousand photographic copies of it were also in circulation; but it is probable, on the other hand, that the small photographs would often serve as advertisements to the engravings, and possibly increase their circulation. There are to be found now hundreds of persons who will pay double the price of the print for extra beauty of a proof, although between the last proof and the first print there can be little difference in excellence. But amongst admirers of works of art, a little degree of superiority will often command a large increase in price, and it is probable that superior texture of the engraving, and other unquestionable advantages, would secure for it a sale undiminished by the widest circulation of photographs, whilst it should be remembered that the wide-spread art education of the people, by disseminating good and cheap art, is continually creating a wider public to purchase good works of art. By employing photography themselves for popularizing their works, the print publishers would take the wind out of the sails of the pirates, and relieve themselves of a constant anxiety and watchfulness in protecting their copyrights.

There is another consideration worth attention, although it is probable that publishers of engravings will not pay much attention to it. It is quite on the cards that photography will, in the coming time, very largely supersede engraving for the reproduction of paintings. We are not particularly anxious for such a consummation. There is a beauty in a good engraving which is entirely its own, and we should be sorry to see an art which can produce the "Piper and Pair of Nutcrackers" fall into disuse. But photography is surely encroaching upon that art. The "means of overcoming the effects of colour in paintings, impossible to translate by photography," to which Mr. Graves refers, are already, to a large extent, found, and it is possible to produce, not translations of the artist's painting, but transcripts in monochrome, with a fidelity which gives them great value. In France, photography is already recognized as a means of reproducing original paintings with a degree of facility and exactness, and at a cost which makes it compete with engraving on terms very unfavourable to the latter. We should have thought that a consideration of these facts might have influenced publishers of engravings to avail themselves of the aid of photography, and, by applying their business knowledge to the new mode of multiplying works of fine art, they might secure the advantages it possesses, and compete successsfully against either pirates or new-comers with less experience in art publication. Mr. Graves recommends the formation of a company for the express purpose of disseminating. Whether such a suggestion is made in earnest or in derision, it is a good one, although not new, and its fulfilment is probably nearer than the writer contemplated. We believe that photography is yet destined to popularize art in a degree scarcely yet contemplated, and that when carbon printing gives assurance of permanency, a new era in the multiplication of works of art will dawn.

In the meantime, however much we may question the wisdom of print publishers, there can be but one opinion on the meanness and dishonesty of piracy, and we are glad to see that in the numerous cases recently brought under magisterial attention, uncompromising justice has been rendered in the exaction of the full penalties prescribed by he Act.

SILVER SOAP IN COLLODION.

We have recently received from Mr. R. H. Courtenay, an ingenious photographer whose attention is chiefly engaged with processes of photo-engraving, some examples of instantaneous photography, and a description of the mode of producing them which contains some suggestions altogether novel.

Mr. Courtenay explains in the letter accompanying the specimens, which are very excellent, that on adding an organic salt of silver to collodion, and developing with pyrogallic acid, he obtained a great accession of sensitiveness, without counterbalancing evil. We quote his letter:—

"Some three or four years ago I was experimenting with collodion, and found that oleate of silver added to the collodion gave, with pyro, clean and good negatives, and the bath did not appear to get out of order more quickly than when the ordinary collodion was in use. The oleate of silver being in excess gives the collodion a milky appearance; but it is kept in solution, being very soluble in ether and alcohol. There is a slight deposit on the shadows, which is scarcely an objection, as many quick pictures must be printed under tissue-paper.

"My plan of making the oleate of silver is to mix separately (say) about a drachm of nitrate of silver and seventy grains of soap used by chemists, known as Castile soap. The soap should be mixed with hot distilled water; the precipitate should be well washed, and put in blotting-paper, and wrung like a cloth, to get all the water away; dry at a gentle heat in the dark; add the powder (when dry) to the collodion for the day's use.

"I develop with two grains of pyro to the ounce of water, with a few drops of acetic acid and alcohol to make it flow, and fix with hypo, and use thirty-five grains of silver to the ounce of water. I use the ordinary commercial nitrate of silver, and always boil a new bath, as well as an old one, with a few grains of iodide of potassium, letting it cool in strong light; and, when cold, add about a drachm of pure alcohol, and filter for use. The collodion I have generally made with iodides of potassium and cadmium, and bromide of lithium. The collodion containing oleate of silver, when paper is coated with it, gives results similar to your collodio-chloride."

On mixing a solution of Castile soap with a solution of nitrate of silver, a decomposition ensues, in which a silver soap, consisting of oleate and margarate of silver, is precipitated, nitrate of soda being left in solution. On adding the silver soap to iodised collodion, it appears to us that the soap will be decomposed, and iodide of silver formed, which produces the milky effect described in Mr. Courtenay's letter. The oleic and margaric acids will combine with the base which has been left by the iodine, and remain, it appears, in solution. Upon immersion in the nitrate bath, oleate and margarate of silver will again be formed in the film, and the presence of this salt appears, according to the experience of our correspondent, to confer a higher sensibility on the collodion. The simplest method would be to add a suitable form of soap to the collodion. Most of the alkaline stearates, oleates, and margarates are more or less soluble in alcohol. Those with a potash base are most soluble, and generally most accessible. Oleate of potash, or ordinary soft soap, is easily obtained, and is sufficiently soluble for the purpose.

As it has been found in various dry processes that an organic salt of silver present in the film is useful, it may possibly be found worth while to try the oleate of silver. We commend the suggestion to some of our experimental readers. It is possible, also, that a method of printing may be found by its aid, either alone in collodion, or in conjunction with the collodio-chloride of silver.

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The British Association—Royal Cornwall Polytechnic Society—The Paris Exhibition—Copyright—Cabinet Portraits—Photolithography—Food for the Camera.

The meeting of the British Association at Nottingham was unusually barren in matters of photographic interest, Mr. Claudet being the only reader of a paper connected with the art, and to this gentleman it appears to be an annual duty, for which we thank him, to keep photography before the eyes of the Association, that Society which is so learned, and whose knowledge of time and space is so extensive, that in its consideration of Creation—which, by the bye, some of its members don't believe in—it takes the tale of the earth as a mere episode or anecdote. A paper to be read before the Mathematical Section must necessarily be more or less specially scientific. The title of Mr. Claudet's paper was, "On a New Process for Equalizing the Definition of all the Planes of a Solid Figure represented in a Photographic Picture," and the author entered at great length into a consideration of the subject. It was perhaps necessary to do this in a paper read before the British Association, but practical photographers will readily understand Mr. Claudet's aim when I mention, that for the purpose of avoiding the excessive sharpness in some portions of a photograph, and the out-of-focus blurring of other parts, he advocated the necessity of moving the lens in and out during exposure, or, as an improvement on this, moving the back lens only of the portrait combination. Now, there is no doubt that this want of distribution of focus has been a great fault in photographs, and photographers would gladly have got rid of it long ago if the opticians would have allowed them to do so; but the latter have obstinately insisted on the fallacy that the maker of the tool knew better what the workman wanted than did the workman himself, and have supplied him with lenses which gave to perfection the very quality the photographer did not want

—optical focus defining only one plane. It is this perfect optical focus that Mr. Claudet would destroy, and give in its stead a picture that was neither painfully sharp, nor suggested any sensation of blurring. In this he is right; but, as was shown in the discussion which followed his paper, the suggestion is a little late, Mr. Dallmeyer having invented a lens, the "Triple Group," specimens taken with which were shown at the meeting, which distributes the focus over a considerable depth, without the trouble and risk of failure that must be entailed by moving the lens during exposure. Photographers are no less obliged to Mr. Claudet for his paper, which is entirely right in its object, but which, a year or two ago, would have been considered to contain most heterodox notions.

Although not directly connected with photographic science, Mr. J. T. Taylor's paper on an Improvement in the Demonstrating Polariscope should be mentioned, partly because the invention belongs to a sort of first cousin to photography, and also because any useful or ingenious invention by a photographer is interesting to photographers. Mr. Taylor has succeeded, by the introduction of a concave lens between the condensers of the magic lantern and the polariser, so to economise the light as to make an argand burner do duty for a lime light.

The meeting, altogether, was a great success, and the papers generally of good quality. There was, perhaps, a greater tendency than usual to insist that man's ancestors were monkeys, or, as one of the Anthropological Section would have it, "not one monkey, but many monkeys." The private hospitality was wonderful, six hundred houses being opened to take the learned strangers in. The excursions were more than usually interesting, and extended from the depths of the coal mines at Nuttall and Annesley to the highest flights of poetry at Newstead Abbey, once the residence of Lord Byron.

Photography continues to receive increased attention, year after year, from the Royal Cornwall Polytechnic Society; and, what gives great value to their efforts, they endeavour to encourage those phases of the science which are more nearly connected with art. The first silver medal and premier prize of the department at the forthcoming exhibition of the Society, is for "The picture showing the greatest photographic skill and artistic taste (any subject)." This leaving it to the artist to choose his own subject, portrait, landscape, figure, &c., for the first prize, so that it is artistically and skilfully done, is much better than confining the artist to any specialty or any locality, or any particular process. Other silver medals are offered for the best landscape and the best portrait. Bronze medals and other prizes are also offered. Last year a medal was awarded to an exhibitor who was only the printer of the proofs, but who did not take the negatives. The mistake was discovered, and the medal withheld: but to prevent such mistakes in future, the following note is appended to the list of medals offered: "Pictures sent in competition for these medals must be exhibited by the artist by whom they are produced." A printer may know no more about art than a hedgehog does about a parliamentary debate, and yet take a prize for artistic photography, if he can obtain, by any means, the proper negatives.

The space to be devoted to Photography at the Paris Exhibition has been awarded, and a list published of the names of the intending English exhibitors, and the space allotted to them. If the demands for space had been published at the same time, it would have afforded a curious comparison with the column of awards, but it was considered advisable not to publish the list of applications. The total quantity of wall space demanded, was nearly eight thousand square feet, to supply which, only two thousand feet were placed at the disposal of the English Commissioners, the floor space being nearly as disproportioned. Of course many must be disappointed, but I imagine that not a few prepared for anticipated disappointment, by applying for a considerably larger space than they could fill if they exhibited all they had ever done since they first blackened their fingers with nitrate of silver. It is remarkable that nearly all the well-known exhibitors applied for only a comparatively small amount of space, while some totally unknown, and others only known by their want of success, applied for hundreds of feet, probably wishing to make up in quantity for the absence of quality. This country will apparently be well represented in the photographic department: the only names of note I miss in the list are those of Rejlander, Joubert, Hughes, Mayland, Caldesi, and Southwell Brothers, the absence of whose pictures will be felt.

Some months ago I visited a famous fishing station, which I knew years ago to be well preserved and plentifully supplied with

"Here and there a lusty trout,
And here and there a grayling."

On the evening of my arrival, I went round to many old friends whom I remembered to be enthusiastic fishermen, to enquire as to the prospect of sport, but all the answer I could get was, "The poachers have got 'em all;" and, like Geraint in Tennyson's Idyll, when, after hearing of the sparrow-hawk from everybody he met in Edyrn's village, he exclaimed

"A thousand pips eat up your sparrow-hawk!
Tits, wrens, and all wing'd nothings peck him dead!"

I was inclined to think they said too much of poachers, but I found the old inhabitants were right: "the poachers had got 'em all." So with the printsellers: they produce famous engravings at enormous cost, but the poachers—the dishonest photographers—appear, the last few years, to be getting all the profit. The copyright laws, in the eyes of those who produce or buy pictures, are very like the game laws in the country: some believe they are just and right, and others think they are iniquitous and bad. I believe that when a law is made, it must be observed. Last year I had occasion to rejoice that the printsellers were defeated in some actions they brought against the pirates, but that was because the printsellers had not obeyed the law, which expressly declares that the name and address of the printseller should be engraved on every copy issued, and, as is well-known, this had been in many cases avoided to give a fictitious value to artist's proofs. These proofs without the publication line are fair game, but the printsellers have lately become wiser, and have complied with the conditions of the Act, and thereby been able to come down after the manner of an avalanche on the pirates who have hitherto laughed at the efforts of the unfortunate printsellers, who, after spending thousands of pounds in the production of an engraving, have not been able to call it their own.

The Cabinet Portrait will be the speciality of the immediate future of photography—there seems to be no doubt of that—and all photographers who have faith in their own powers will do well to foster the fashion which appears destined to supply the place of the fast waning carte de visite, Besides the increase of business this change must bring, it will do good in other ways: it will go far towards improving and sustaining photography as an art. Travellers in the Highlands and some parts of Wales are surprised at the remarkable health of the inhabitants, and the absence of consumption, although the children run about barefooted and bareheaded in all weathers. The reason is, that this severe treatment kills off all the weak ones, and only leaves the strong for the inspection of the intelligent tourist. And so it will be with cabinet portraits; the large size, and good proportion, will necessitate a better knowledge of art, and greater photographic skill than the carte de visite, and the "weak ones," (that is, all those who have taken to photography without any capacity for the profession) will be "killed off," and the business left in the hands of those who are able to maintain its dignity and position in art by the production of good work.

The Twenty-seventh Annual Report of the Deputy Keeper of the Public Records is a very interesting document—interesting not only to literary men and archæologists, but to those who follow the progress of photographic processes in their economic aspects. Photozincography has been largely employed in reproducing historical documents. The work of producing facsimiles of records and documents by this process was carried on at the Ordnance Survey, Southampton, under the direction of Mr. William Basevi Sanders. The first part, comprising documents from the Conquest to the reign of Henry VII., was published in March, 1865; and the second part, consisting of documents of the reigns of Henry VIII. and Edward VI., was nearly ready for publication at the close of the year. The third part, including the reigns of Mary and Elizabeth, has been commenced. A similar collection of the national documents of Scotland is in progress. At the end of July, last year, a portion of the documents selected from the national manuscripts of Scotland were sent to the Southampton establishment, and by the end of September the whole of them were photographed. The plan adopted for the Scotch records is peculiar. Each copy scales exactly with the original. Many of the Scotch MSS. were so large that, in order to copy them in the manner decided upon, without any reduction of size, it became necessary to photograph them in sections, as many as seven separate negatives having to be taken of the same record in one or two instances. The size of the documents prevented their being placed in the glass frame, and it was consequently impossible to prevent the parchment from temporarily shrinking under the high temperature to which it would have to be submitted in a glass-room, and so rendering the size of the letters smaller in each succeeding negative. Fortunately, the weather was exceptionally fine, and the exposure consequently so short that the operators were enabled to get the negatives before the sun and wind had had time to distort or shake the letters. The next step was to prepare the transfer, and, in order to do this, it was first necessary to take a separate carbon print of each of the sections in which the original had been photographed, to cut off the surplus portions, and to piece the remainder together with such nicety that no division should be visible. The first instrument copied in this way was the Bull of Pope Honorius III. to King Alexander II., conferring privileges on the Church and Kingdom of Scotland, dated from the Lateran, November 21, 1218.

At the soirée of the Photographic Society, held in June last, on a table placed under the gigantic portrait of the gigantic Chang, were displayed some delightfully delicate little pictures of the neighbourhood round Lindfield, in Sussex, by Mr. W. Durant, of that place. "What manner of country is this," thought I, "so near to London, and affording such a large number of capital subjects for the camera?" Mem.—To take the first opportunity of going to see. That opportunity occurred a few days ago, and I visited this beautiful spot, and found it impossible to take a walk in any direction without meeting with a picture at every step. Picturesque houses, from the great city magnate's Gothic castle down to the ruined barn; trees of every English variety, set in most luxuriant ferns and undergrowths; quiet lanes, dappled over with chequered shade; old porches, covered with rose blossoms; honeysuckle hedges, rich with perfume; woods and glades and tangled dells, meet the eye everywhere; and, to complete the picture (for what landscape is complete without water?), the river Ouse, rich at this time of year with water lilies, flags, and other water plants that decorate a foreground with intricate detail, runs through the district. Even with all these advantages, a landscape is not quite complete without a figure, and this last touch to the picture appears to be easily obtainable, for the most picturesque and good-natured natives are to be met with everywhere. Photographers who have exhausted the neighbourhood of London will be glad to hear of this new mine of pictorial gold

ON THE PRODUCTION OF PHOTOGRAPHS IN PERMANENT COLOURS.

MM. BEYSE AND JOSS' METHOD.*

Treatment of the Carnation Solution.—In dealing with the carnation solution, a thorough knowledge of flesh tints, and great care in manipulating, are required; for these reasons it has been deemed necessary to give very detailed instructions with regard to the mode of its application. Even with the most careful treatment, some of the pictures assume a yellowish colour where the carnation fluid has been applied; and although it has been impossible to discover the cause of this change, it may be easily remedied in the following manner.

Two drops of carmine red are put into a saucer, and sufficient gum-water and ammonia and distilled water are added to render it of a pale rose colour. The picture is taken from the washing-trough, laid on a glass plate, and carefully dried in the usual manner, with filtering-paper; all the yellowish portions are then treated with this pale red liquid, allowing it to remain a short time in contact before being blotted off with filtering-paper. The flesh tints will then assume a warm tone. Pictures which have already derived a warm tone from the hyposulphite must not be submitted to this treatment, as otherwise a reddish colour is produced.

All the flesh shadows are now treated with carmine red; the darker the shadow, the thicker must be the coating, gradually diminishing towards the lights. The carmine must be blotted off immediately, and not allowed to remain on the picture for an instant, as the slightest blush of red only is required. All portions of the face which in nature are of a somewhat reddish hue (viz., the cheeks, chin, ears, between the eyes, and eye-brows &c.) are treated in like manner with the carmine. It is impossible to give very definite instructions with regard to colouring the different parts of the face, as these vary greatly in all portraits, and therefore very much must be left to the discretion of the artist. In tinting the cheeks, the colour should be applied in the centre, and gradually softened down on all sides. The colour is applied one or more times, according to whether a pale or fresh complexion is desired. The colouring fluid is allowed to remain in contact with the lips for some little time before it is blotted off, in order that they may become of a bright red; and the upper lip, being somewhat in the shade, generally requires a second treatment. The neck, shoulders, arms, hands, and legs must be treated so as to coincide with nature as much as possible. Of course, the more skilful the artist, the better will be the results obtained. Pictures, and more especially busts, may be produced by this process, which, in regard to softness and truth to nature, surpass paintings of any other description.

Bluish violet tints under the eyes, on the beard, or chin, are attained by a single application of the blue developing solution diluted with thick gum-water, ammonia, and distilled water.

The colouring, as above described, is effected after the picture has been treated with the carnation solution No. 1. The carnation solution No. 2 is used only when very delicate tints are required; it contains sulpho-cyanide of ammonium, and should be applied to parts of the picture already treated with the No. 1 solution, and allowed to remain in contact but for a few seconds. The carnation fluid No. 3 is made with bichlorate of mercury.† It is employed on rare occasions in colouring prints which have been kept some time, and have assumed a brownish tone. Such prints are thoroughly moistened, and treated momentarily with the liquid, after which they are well washed in clean water, to remove any superfluous mercury salt. By these means the brown flesh tints become of a light warm tone. Much care is required in the employment of this liquid, for if allowed to remain in contact too long, the mercury will destroy the metallic compounds present in the picture.

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* Continued from p. 391.

† Bichloride of mercury is evidently meant.—Ed. P. N.

The colouring with carmine red is proceeded with in the same manner after the application of solutions Nos. 2 and 3, as in the case where No. 1 solution alone was used.

The colouring of the eyes is next proceeded with. Blue eyes are produced with a blue solution composed of indigo and carmine, which must be blotted off immediately after application; brown eyes are treated with the brown fluid, and black ones remain untouched. The eye-lashes and brows may be touched with the requisite colours, but much care is required in doing so.

The dress requires to be coloured very evenly, to prevent the formation of blotches and spots. When a large surface is to be coloured, it is best to apply the liquid to a portion only of the dress at a time, treating each division made by the folds and shadows separately. In this way any part of the dress, limited by certain folds, may be obtained of any required tint on being treated with one or more applications of the colouring fluid. No notice need be taken of light and shade, but care is required not to overstep the outlines, and to lay the fluids on equally.

To produce a violet, the red and blue solutions must be mixed, or they may be applied alternately, according to whether a reddish or bluish violet is desired.

To obtain a green colour, a coating of turmeric yellow is first laid on, and then covered by a blue; if a dark green is required, the blue must predominate, and *vice versa*.

Orange is made by applying yellow to a red ground; or, if it is required of a very brilliant hue, the red is first treated with sugar of lead, and afterwards with chlorate of potash.

Flowers are coloured in a suitable manner, the different solutions being applied to the shadows a second time, in order to obtain the requisite depth of shade. Foliage of any depth of colour may be produced by a mixture of turmeric yellow and blue. Brilliant yellow, to represent gold jewellery, is produced by coating the picture first with sugar of lead, and subsequently with chromate of potash. Zinnabar, or fiery red colours which have been treated with the blonde solution before fixing, are simply coated with red to obtain the required tint. Brown and black portions of the picture, as also glaring whites, are much improved by retouching.

Such are the general directions for colouring photographs by this process. Anyone acquainted with colouring by the ordinary method would, of course, be able to effect many little alterations and improvements in carrying out the process, and much time and labour will be saved by applying at one time a colouring solution to all portions of the picture required of the same tint. Two skilled workmen—one for manipulating, the other for colouring—may produce one hundred pictures daily. Reckoning the wages of these two men at eight shillings and sixpence a day, and the value of the materials for colouring a dozen prints at fourpence, the cost of the finished coloured picture would only amount to twopence more than that of an ordinary black print.

Before being issued, the pictures must be rolled and properly finished off in the ordinary manner.

Preparation of the Colouring Fluids.—Thick gum-water is an indispensable requisite in the preparation of all these solutions. It should be of the consistency of syrup, and always kept ready made. The gum should be of the best quality, finely powdered, and carefully sifted, to free it from any foreign matter; it will take two or three days to dissolve in the water, if of the proper consistency.

A solution of ammonia containing two per cent. of liquor ammonia dissolved in water should likewise be kept ready at hand; it must be stored in a well-stoppered bottle, in order to prevent the ammonia from evaporating.

Carnation Solution No. 1.—Forty grains of hyposulphite of soda are put into a bottle holding an ounce and a half, and to it are added 400 grains of distilled water; when the soda is perfectly dissolved, the bottle is filled up with the thick gum-water, and mixed by being well shaken. The bottle to be corked and labelled as above.

Carnation Solution No. 2.—Forty grains of sulpho-cyanide of ammonium are dissolved in 400 grains of distilled water. This is put into a 1½-ounce bottle, with the addition of as much gum-water as the bottle will contain.

Carnation Solution No. 3.—This is composed of 15 grains of bichlorate of mercury and 400 grains of distilled water, with the same amount of gum-water as in the previous solutions.

Iodide of Potassium Yellow No. 4.—Forty grains of iodide of potassium are put into a 1½-ounce bottle, and dissolved with 400 grains of distilled water; gum-water is added in the same quantity as above, and the bottle corked and well shaken.

Composition Yellow No. 5.—Twenty grains of iodide of potassium, 10 grains of hyposulphite of soda, and 10 grains of crystallized sulphate of iron, are dissolved in 400 grains of distilled water, and the usual quantity of gum-water added.

Composition Yellow No. 6.—Fifteen grains of iodide of potassium, 5 grains of hyposulphite of soda, and 20 grains of hyposulphite of protoxide of iron and ammonium, are dissolved in 400 grains of distilled water, and the usual quantity of gum-water added.

By varying the proportions of iodide of potassium, soda, and iron, any shade of yellow may be produced.

Persian-berry Yellow No. 7.—Two ounces of Persian berries are put into an evaporating-dish with half a pound of distilled water, and heated over a spirit flame. When the water is on the point of boiling, add one drachm of alum, and when it has been reduced by evaporation to one-half of its original quantity, it is strained through a piece of cambric. A 1½-ounce bottle is half filled with this yellow fluid, and afterwards completely filled up with equal parts of gum-water and the ammonia solution (containing two per cent. of liquor ammonia). The mixture must be well shaken.

Turmeric Yellow No. 8.—Two ounces of fine turmeric powder is heated in an evaporating-dish with half a pound of distilled water. It is well stirred and boiled for a short time, after which it is first strained through cambric, and then filtered through blotting-paper. The liquid is mixed in the same manner as No. 7, half filling a bottle with it, and then adding equal quantities of gum and ammonia solutions till the bottle is quite full.

Golden Yellow No. 9.—This may be made in two ways:

1. Twenty grains of sugar of lead are put into an ounce bottle with 280 grains of distilled water; on dissolving, add a quarter of an ounce of gum-water.

2. Six grains of chromate of potash are dissolved in 280 grains of water, and put into an ounce bottle, with a quarter of an ounce of gum-water.

(To be continued.)

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ON THE DETECTION OF IODINE.

BY M. CAREY LEA.

Where iodine exists in the form of hydriodic acid, or the iodide of a base, two methods are commonly employed to put it into a condition to be detected by the starch test. One of these is by the action of nitric acid, the other by chlorine or bromine water. The latter is the more delicate, but has the disadvantage that if the chlorine or bromine be added in excess, the reaction is missed.

It occurred to me, while engaged in testing for iodine, that the facility with which that body is eliminated from its hydrogen and metallic combinations by *chromic acid* would make the latter substance a valuable means of bringing about the starch reaction, and a few experiments completely confirmed this view.

If, for example, we take an extremely dilute solution of iodide of potassium, such that the addition of nitric acid and starch produces no perceptible effect, the further addition of a single drop of very dilute solution of bichromate of potash will instantly bring about the characteristic reaction.

When chlorhydric acid is substituted for nitric, the effect of the bichromate is (as was to be expected) still more marked. The test has then the full delicacy at least of the chlorine test, with this great advantage, that an excess of the reagent does not prevent the reaction.

As to the delicacy of this test, the following observations were made :—

With solutions of iodide of potassium up to one hundred thousandth (1 : 100,000) the precipitate was abundant, becoming less blue and more tawny as the solution increased. Beyond this point the distinctness rapidly fell off. The indications were observable at one four-hundred-thousandth. With a solution of one-eight-hundred-thousandth it was doubtful whether any effect was evident ,though still it was thought that a darkening was produced.

The experiment can be made in two ways, according to the result desired.

If it is wished to observe the effect of the chromic acid in increasing the delicacy of the indication, add the acid and starch to the very dilute solution of iodide, and then, when the extreme dilution is such that no reaction appears, a drop of solution of bichromate instantly produces it.

But in employing the reagent in the search for iodine, add the starch to the liquid to be tested, stir it up, add a drop of dilute solution of bichromate (enough to communicate a pale yellow colour), and finally add a few drops of chlorhydric acid. The test is then the production of the characteristic precipitate, or in case of great dilution, approaching to a half-millionth, merely a tawny shade given to the solution.

It seems scarcely necessary to say, that if a very great excess of acid is used, and too much bichromate, the starch may be made to reduce the bichromate. Even this, however, cannot deceive, for a bluish-green solution is thereby produced, whereas the indications of iodide are in the order of their strength : blue precipitate, tawny precipitate, tawny solution. Unless in the case of very exceptional dilution above spoken of, a well-marked blue precipitate is always obtained.

The examination of the delicacy of the reaction with very dilute solutions was made at a temperature of 65° F., or thereabouts. This fact requires to be taken into account, as according to some experiments of Fresenius, to be found in the Jahresbericht for 1857, the delicacy of the starch test increases as the temperature falls, so that at 0° C. a fainter trace can be rendered evident than at 12° C., and so on: the difference is asserted to be material. Fresenius's experiments were made with sulphuric acid and hyponitric acid, and the delicacy of the reaction obtained by him at corresponding temperatures seems to fall little short of the above.—*Silliman's Journal.*

ON A DEFECT IN THE DEMONSTRATING POLARISCOPE, WITH A SIMPLE AND EFFECTIVE REMEDY.

BY J. TRAILL TAYLOR.*

Having, during the past winter, been engaged in some experiments requiring the use of a polarizing lantern for projecting a disc of polarised light on a screen, I was struck with the inefficiency of even the best instrument for that purpose that I was able to procure. The one in question was constructed by Darker, and may be accepted as a type of the whole. By a simple deviation from the ordinary principle of construction, I have succeeded in producing a polarizing lantern in which the light is so much more perfectly polarized as to permit objects to be projected on to a screen and exhibited under but little less illumination when a good Argand lamp is employed, than when—with the original lantern—a lime light is used. The following description will explain both the defect alluded to and the improvement proposed.

When a lantern is fitted up in the usual way, to show the effects of polarization, the rays fall upon the polarizing plane ; in this case a parcel of nine or ten plates of ordinary polished glass, inclined to the axis of the rays of light at the polarizing angle of 56°, in the form of a cone. Now, while the axial ray impinges on these plates at the correct angle of polarization, it naturally follows that no other portion of that cone of light can possibly do so, and consequently that the axial rays only are polarized, an immense loss of polarized light ensuing in consequence.

The remedy I propose consists in intercepting the rays, after leaving the condenser and before reaching the polarizer, by a concave flint lens, similar to that of the back portion of a photographic portrait combination, by which the whole mass of light, thus rendered parallel, is caused to impinge on the polarizer at the correct angle of polarization, and by which is also secured comparative freedom from the chromatic and spherical aberration caused by the condensers. After the rays are reflected from the polarizer, they are again rendered convergent by being transmitted through a small achromatic lens placed near the stage of the lantern, which also secures all the advantages so well known to arise from the employment of an achromatic condenser.

ON THE ACTION OF GELATINE IN THE IRON DEVELOPER.

BY M. DAVANNE.

The methods in use may be divided into two groups: the first group is represented by Lea's original method as a type; in it the gelatine is modified by treatment with sulphuric acid, and the solution mixed with metallic iron. In the second group green vitriol is simply mixed with gelatine and some acetic acid.

Both methods are good ; with both, good negatives are readily obtained. Yet there is a material difference, for those of the first group are always considerably denser than those of the second. If, as is done by Jabez Hughes, one part in 4,000 to 5,000 of gelatine is added to the ordinary ammoniacal iron solution, good negatives are obtained, as also by adding larger quantities of sugar, honey (up to 10 per cent.), glycerine, &c.

If the developer is prepared by Lea's method, the negative is developed more slowly but more powerfully than by the former method. If very dense negatives are desired, then take Lea's or a similar developer. If less dense ones, a mixture of ammoniacal iron, with gelatine or sugar, honey, &c.

Carey Lea modifies the gelatine by sulphuric acid. It would be interesting to ascertain in what the change consists. A very small quantity of sulphuric acid imparts to gelatine the property of solidifying ; it becomes a kind of liquid glue, which Maxwell Lyte has already employed in his metagelatine method. A small quantity of metagelatine, prepared by Lytes' method, added to the iron solution, gave us results different from those of ordinary gelatine. Thus it would seem that the properties imparted to the solution are due to the sugar of gelatine (glycocoll) formed. I obtained, in fact, far more intense black by the addition of a few drops of syrup of glycocoll to the iron solution.

I give briefly the methods for preparing the gelatine iron developer.

(1) *Carey Lea's Method with Modified Gelatine.*—Thirty grammes of gelatine are allowed to soak in 90 grammes water, and 16 cub. centims. sulphuric acid then added, and the whole boiled for a few minutes ; iron filings or wire are next added, and the digestion continued at a gentle heat until no more gas-bubbles are disengaged. Five grammes of acetate of soda are added, and the solution diluted to 500

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* Read before the British Association at Nottingham, 1866.

cub. centims. If the picture comes out too abrupt and hard, the liquid is diluted with water or ordinary solution of iron.

The above yields a solution containing 15 per cent. As 5 to 6 per cent. are generally sufficient, two or three times as much water may be advantageously used.

(2) *Method with Unaltered Gelatine.*—Four to five grammes of gelatine are dissolved in some glacial acetic acid, and added to a litre of ordinary ammoniacal iron developer.

After these practical directions, the theoretical part requires to be discussed; namely, what the action of this developer on nitrate of silver is, and the reason why pictures made with it are so intensely coloured and so dense.

Gelatine is not chemically united with iron in the developer; if Mr. Gatehouse, in his investigation of the crystals which separate from the mixture, has found gelatine, I can assert that this may be completely removed by recrystallization. Hence we are concerned with a mixture, and not with a chemical compound.

To understand the action of this mixture, I prepared a number of green vitriol solutions; one acidulated only with glacial acetic acid, the others mixed with various organic substances, with sugar, honey, milk-sugar, glycerine, gelatine, albumen (the latter can only be used in small proportion, as it is coagulated by nitrate of silver). Equal quantities of these solutions were mixed with equal quantities of nitrate of silver. The pure iron solution quickly gave a grey, granular, dense precipitate. If organic matter is present, the precipitate becomes far darker and finer; it is formed very slowly: with the addition of gelatine it is so fine that it only settles after twenty-four hours. On attempting filtration, it passes through the filtrate. My investigations coincide with those of Mr. Lea in this respect; as the precipitate of silver is far more slowly formed and deposited, more intense images are obtained; the images are purer, as no general precipitate is formed, and the colour is actinic, for the silver is very finely divided.

Hence it can be assumed that gelatine imparts to the developer a mucilaginous condition, and thus moderates the too quick action of green vitriol on the nitrate of silver; if the gelatine developer is prepared by Lea's method, the action of the glycocoll on the colour of the precipitate must be added.

It has been thought that the deeper colour of the precipitate produced by the gelatine developer is to be ascribed to a compound of organic matter with the silver, a kind of lac, like that whose importance in the production of the positive image M. Girard and myself have explained; but this theory was not confirmed by analysis.

I collected the various precipitates, which were obtained partly by pure sulphate of iron and partly by its mixture with organic matters. The precipitate obtained with pure sulphate consists of pure metallic silver, with which only a few thousandths of basic ferric acetate are mixed; on calcination the latter gives off acid vapours, and the residual iron imparts to the silver a rose-colour. The precipitate obtained with the gelatine developer has a fatty feel; after suitable washing it is found that not more than 2 to 2½ per cent. of organic matters are contained in it. This quantity is sufficient to give the precipitate that dark colour, but is not so great as to justify the notion of there being a compound; hence we may say *the negative image consists of a precipitate of pure silver, and it is immaterial whether it was developed by pure solution of iron, or its mixture with an organic substance.*

This point reached, it appeared interesting to analyse the precipitate produced by pyrogallic acid, to see whether the expressions so frequently used, gallate and pyrogallate of silver, have any justification.

If an ordinary solution of pyrogallic acid (1 gramme of 250 cub. centims. water, and 10 cub. centims. acetic acid) is mixed with 3 per cent. silver solution, a blackish precipitate is obtained, which shines in water, and appears formed of a small metallic laminæ, This precipitate gives on analysis not more than 1 to 1½ per cent. of organic constituents. But if the solution is mixed with an 8 per cent. silver solution, a brown precipitate is obtained, and a strongly coloured liquid; analysis shows that the precipitate contains 10 per cent. of organic matter. This, however, is not combined with the silver; no pyrogallate of silver appears to be formed. The substance results from the action of the nitrate of silver on the pyrogallic acid; as it is very slightly soluble, it is deposited simultaneously with the metal, from which it can be separated by washing with water. This fact explains why the negatives strengthened by pyrogallic acid immediately lose their dark-brown colour by the varnish: the alcohol contained in it dissolves and removes part of the brown colouring-matter. I am engaged with M. Girard in investigating this substance, and will afterwards report upon it.—*Bulletin de la Société Française de la Photographie.*

PEROXIDE OF HYDROGEN.*

BY A. J. DE MORAT.

As the use of peroxide of hydrogen for eliminating hyposulphite of soda seems to be exciting the fraternity at present, I beg to state that I have used it as far back as the spring of 1863. My experiments were not extended to a large number of trials, but were made simply on a batch of prints which were apparently totally destroyed by a long immersion in a weak solution of hypo, during which time being exposed to diffused light caused a formation of sulphide of silver, so great that hypo at saturation did not prove successful in removing any trace of this yellow colour, which the sulphide of silver had imparted. Finding my prints all lost, I therefore instituted a number of experiments. All were useless, except a weak solution of peroxide of hydrogen, that I had remaining from a series of experiments made in connection with the salts of alumina and lead, for the purpose of producing instantaneous pictures. This seemed to remove the yellow stains after an immersion of about ten minutes.

The use of peroxide of hydrogen was not limited to that experiment. I also used it on oil portraits, for the purpose of copying them with greater facility; that is, by transforming the black sulphide of lead into a white sulphate of the same, or, in other words, oxydising the former, and thereby rendering the picture clearer and whiter, and also never forgetting to moisten its surface with clean water half a minute previous to making its copy. The latter has been published since.

I will here give the cheapest mode of preparing the peroxide of hydrogen with its reaction,—by passing a current of carbonic acid gas through water having binoxide of barium in suspension. Thus the reaction—

BaO_2+Bioxide of barium. CO_2+Carbonic acid. HO. Water. forming—

BaO.CO_2Carbonate of baryta.+HO_2 Bioxide of hydrogen.

ZENTMAYER'S NEW LENS.

BY PROF. HENRY MORTON, PH.D.

The new photographic lens invented by Joseph Zentmayer, of this city, is of the greatest interest, not only in a practical sense, because it is a most excellent and efficient instrument, which can be constructed at less than half the cost of any other equally good combination, and possesses other like advantages of lightness, compactness, adjustability, &c., which will be more fully stated hereafter, but in a scientific point of view also, because it involves new principles and new applications of optical laws.

The theory of this lens may be best explained by the following progressive illustrations:—

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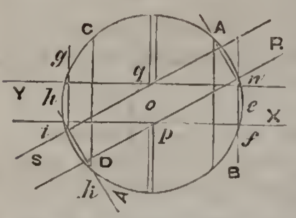
* *Philadelphia Photographer.*

Let A B and C D represent two plano-convex lenses exactly alike in every respect, so placed that their outer surfaces form parts of the imaginary sphere, A C D B, and with a small opening, *p q*, in a central diaphragm. Neglecting for a moment the bending of rays by refraction, we see that the only rays which can pass the diaphragm are those which come normally upon the outer surface, as X Y and R S. Supposing sections to be made in the direction of the chords, *n f*, *g i*, we see that the ray, X Y, will be subjected to the action of two small lenses, *n e f*, *g h i* (limited by the size of the diaphragm), and two blocks of parallel glass. The aberration, spherical and chromatic, may therefore be regarded as that only which is due to two such extremely minute lenses.

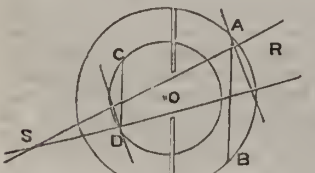
Fig. 1.



Turning again to the ray, R S, and supposing similar sections, A *n* and *i k*, we have the ray again acted upon by two small lenses like the first, but in this case traversing two prisms. As, however, these are exactly equal and opposite, they will correct each other; and the aberration in this, as in the former case, will be such only as is due to the two small lenses. We are here speaking, it must be remembered, only with the purpose of explaining a general principle, and without regard to accuracies of detail, which would confuse the subject, as we think.

In this preliminary illustration we have made no account of the *deflection* produced by the first prism, nor of the *concentration* due to the little lens. To meet the first, the diaphragm is moved a little forward from the centre, O, and for the second, in place of the large lens, C D, a smaller one of shorter radius is so placed that its outer surface is practically concentric with that of A B. (See Fig. 2.)

Fig. 2.

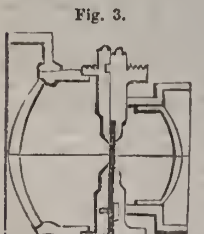


The converged ray thus finds in C D an equivalent opposite prism to that it traversed in A B, and is only subject to the aberrations due to the two small lenses, now of *unequal* curve.

Thus far the general principle by which a lens of very small aberration may be made with only one kind of glass, or without *correction*, has been treated.

Such a combination, however, as that last described would be of little value, because of its very short focus, and want of flatness in field. To remedy these difficulties, in place of plano-convex, meniscus lenses are used (as shown in Fig. 3), whose inner curves are to their outer ones as thirteen is to twelve. The curves of the two lenses are to each other as three to two in all cases. Any variety of combinations and series of focal lengths might be constructed on the above principle, but the plan adopted is as follows:—The most complete set consists of six lenses, whose focal lengths are—

Fig. 3.



I. 5·333 inches.	IV. 18 inches.
II. 8 ,,	V. 27 ,,
III. 12 ,,	VI. 40·5 ,,

These may all be successively arranged in the same mounting, giving combinations with focal lengths and circular fields at 90° as follows:—

Lenses I. and II. give a focal length of 3·55 inches, and field 7 inches diameter.

Lenses II. and III. give a focal length of 5·33 inches, and field 10½ inches diameter.

Lenses III. and IV. give a focal length of 8 inches, and field 16 inches diameter.

Lenses IV. and V. give a focal length of 12 inches, and field 24 inches diameter.

Lenses V. and VI. give a focal length of 18 inches, and field 36 inches diameter.

Thus, with six lenses and one mounting, five different instruments may be successively adjusted in as many minutes, the mounting being so arranged as to fit into the camera either way. To pass from one focal length to the next longer in the series, it is only necessary to take out the smaller lens, and put in its place the second size above. Thus, to change eight inches into twelve, lens No. III. is replaced by No. V., and the mounting reversed. A little shutter, close to the central diaphragm, serves for "exposing" in place of a cap; and a diaphragm plate is arranged with three holes for each combination: a large one for focussing, a middle size for quick work, and a small one for fine and difficult work, for it is one of the merits of this lens that a large stop may be used for focussing, and a small one thrown in for the exposure, with not only good, but the very best effect.

In these lenses the visual and actinic foci appear to coincide,* so that no adjustment after focussing is needed. The field is very equally illuminated, because, no doubt, as will be seen from Fig. 1, the marginal rays, as well as the central, are normal to the first surface, and do not lose unequally by reflection. The depth of focus is most remarkable, and for quickness of work surpasses that of any like instrument. Excellent views have been taken in fifteen seconds on a bright, and thirty seconds on a dark day.

ON THE VARIOUS METHODS OF ENGRAVING PHOTOGRAPHIC PICTURES OBTAINED UPON METALS AND STONE.

The nearer photography approaches perfection the more evident it becomes that the real aim to which its applications tend is that of printing by the ordinary methods. If we go back to the origin of photography, we recognise that such was the solution sought from the very first, and that it is only later that this side of the problem was abandoned for others. The attempts made in this direction have been abandoned for a long time, and it is only within the last few years that they have been resumed; but they have made, in a very short time, such rapid progress, that the moment is not far distant when photographic pictures will be produced upon the largest scale, under conditions suitable for being printed at the press.

We have thought that it would be interesting to publish the whole of the methods now generally employed for engraving the photographs obtained upon metal or stone.

No. 1.—Liquid for Engraving upon Copper.

Prepare a saturated solution of copper in nitric acid, and a concentrated solution of chloride of ammonium in acetic acid. Mix three parts of the cupric solution with one part of the solution of chloride of ammonium. We thus obtain a liquid which it is only necessary to pour upon the plate of copper bearing the photographic picture, after surrounding the plate with a border of wax to prevent the solution flowing off. The solution must be strengthened with nitric acid, which is added drop by drop, until it bites well.

The photographic proofs obtained directly upon the plate, by means of bichromate of potassa, must be engraved by means of a solution of chloride of iron.

No. 2.—Liquid for Engraving upon Steel.

With the following liquid we obtain very fine lines, even when the steel is of poor quality. In 500 parts of alcohol

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* With a small aperture, the pencils may be so attenuated that the difference between the visual and actinic foci is not marked; but a lens in which only one kind of glass is employed cannot be achromatic, and a difference between the actinic and visual foci, to the extent of about one-fortieth of the focus of the lens, must exist.—Ed. Photographic News.

(88° Tralle) dissolve 33 parts of nitric acid, sp. gr. 1·22. The operation must take place at 60° Fah. When the mixture is complete, add to the liquid 0·33 parts of nitrate of silver, previously dissolved in distilled water. This solution may be prepared beforehand.

If the varnish be weak, it will be better to employ the following solution :—

Alcohol	6 parts.
Distilled water	9 ,,
Pure nitric acid	16·60 ,,
Nitrate of silver	0·83 ,,

The liquid improves by keeping.

To obtain a design, very clear and sharp, upon steel, we employ the three following liquids :—

a. The mordant, the formula of which is given above.

b. Distilled water, to which is added 4 per cent. of nitric acid, sp. gr. 1·22.

c. Distilled water, containing 6 per cent. of alcohol at 88° (Tralle's).

Commence by washing the plate containing the picture, during forty seconds or so, with the liquid *b*, quickly throwing off the liquid before it has time to dry on; then cover the plate with the solution *a*. It is understood that the plate must be bordered with wax, and the depth of the liquid covering it must not exceed a quarter of an inch Immediately this liquid comes in contact with the plate, the denuded parts of the metal begin to be covered with a greyish-black powder, which must be constantly removed carefully with a soft brush, so as to allow the liquid to reach the metallic parts lying beneath it, and to bite in more deeply. When the action appears sufficient, pour off the liquid, and carefully wash the plate with the liquid *c*, and then leave it to dry. The solution *a* must remain on the plate about three minutes; if it be allowed to remain on longer, the plate will become covered with mud, because the mordant is no longer in a condition to act. The final effect aimed at is obtained by repeated bitings. The plate must be well washed between the successive actions of the corrosive liquids, and the operation must be repeated until the lines attain the desired depth. Attention must be paid to the temperature, which, both in the plate and in the place where the operation is carried on, must never be lower than 66° Fah., nor higher than 75° or 76° Fah. Eight minutes' biting at the temperature of 60° Fah. is equivalent to six minutes at 76° Fah. The above formula may also be employed with the addition of concentrated acid to the mordant. The pictures obtained upon steel with bichromate may be engraved in this manner.

No. 3.—Liquid for Engraving Electrically upon Zinc.

The pictures obtained with bitumen upon zinc, those prepared with bichromate of potassa and Brunswick black, may be treated either by the galvanic process of engraving, or by Colonel Sir Henry James' process. Of these two methods the latter is the most expeditious. We proceed to describe the first.

Immediately after the development of the picture, and when the varnish is dry, the plate, the back of which, as well as the parts not intended to be submitted to the action of the mordant, being coated with Brunswick black, is by means of a copper conductor put in communication with a plate of copper placed at a distance of a quarter of an inch. This galvanic couple is introduced into a solution of sulphate of copper, marking 15° Baume. The sulphuric acid set free by the decomposition of the sulphate of copper dissolves those portions of the zinc unprotected by the varnish. The plate may be engraved more or less deeply, according to the nature of the design. But as, in general, a single pair acts but feebly, it is usually found necessary to put this couple in communication with a battery, if we desire to obtain sufficient depth of corrosion. To give the plate the appearance of a lithograph, the action must be prolonged to about five minutes; if we wish to make a pen-and-ink drawing, we must extend the action to seven minutes. It is to be observed that the sulphate of copper does not attack even the most delicate lines, nor exercise any action on the varnish.

No. 4.—Mordant for Lithographic Stone.

For designs formed simply of lines and hatchings, take—

Gum arabic	4 ounces.
Distilled water	14 ,,
Commercial nitric acid	2 drachms.

We can prepare this liquid either at the moment of using it, or make the solution of gum in advance, adding the acid at the last moment.

For designs with half-tones the following liquid is recommended—

Gum arabic...	4 ounces
Distilled water	16 ,,
Hydrochloric acid	2½ drachms.

Sometimes a certain quantity of water is added to this liquid, and a linen rag soaked in it, which is left all night in contact with the picture.—*Photographisches Monatsschrift.*

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ARTISTIC COPYRIGHTS.

The following letter has been addressed to the editor of the *Daily Telegraph* :—

Sir,—Our attention has been called to your leading article on the late decisions at the Bow Street Police Court. We trust we may be permitted to offer a few remarks in explanation, and shall feel obliged by your giving them publicity. We, ourselves, have no doubt but that your observations have been published with good intent, and we thank you accordingly, but we believe they are calculated to mislead. You advance that "there is nothing like a frank examination of the facts." You are, of course, aware of the great expense attending the production of engravings—that there is a certain sum to be paid to the painter for permission to reproduce the design of his painting, technically termed copyright; that there is a certain stipulated sum receivable by the engraver; and lastly, that there are very heavy expenses incidental to, and inseparable from, the publication. We are quite at a loss to understand upon what principle of justice it can be argued that we are not entitled to reap the fair fruits of our ventures in the manner that may seem best to us. We purchase the right of publication, and surely we ought to be allowed to be the best judges as to whether it will answer our purpose to issue cheap reproductions of our publications. We certainly do "protest against so cheap and delightful a dissemination of our property," when we take into consideration what we have paid to become possessed of that property; whereas they who infringe our rights do so without any payment whatever to the artist or to ourselves, and to our great and manifest injury. You argue that "a national loss is suffered if free trade be not extended into this department of industry," and that you "look upon the law itself, and the relation it establishes between the engraver and the photographer, as positively deplorable for Art education." To this we reply, that free trade in Fine Arts does exist, and has always existed; but we further add, that there is all the difference in the world between free trade and free booty, as pointed out most clearly by the late Mr. Cobden, when the "Copyright in Designs Bill" was brought before the House of Commons for consideration. The market is open to the highest bidder. Take, for example, the Exhibition of the Royal Academy for the present year. 760 pictures were exhibited; of these we have purchased the copyrights in ten. It is quite clear, therefore, that these copyists are free to select from the remaining 750—and surely it is hard if there cannot be found some amongst these pictures worthy of reproduction—nay, even had these said copyists been so disposed, they could have forestalled us in the purchase of these ten. There is, then, free scope for all. But not so: these copyists prefer to wait and see what we publish, and thus not only take advantage of our lengthened experience in selecting what is most likely to prove acceptable to the public taste, but also sift again, as it were, and only pick out for copying those subjects which happen most to take with the public, and to which we have to look to recoup us for losses we sustain in publishing unpopular subjects. If the copyists are so eager to "see scattered broadcast through the land" the finest examples of Art, why do they not enter into the lists with ourselves and others, become publishers, and, in honourable competition, employ painters, commission plates, photograph them, and issue them at reduced and nominal prices? We would suggest, as the best remedy, to form a public company (limited) for the express purpose of disseminating "cheap Art." We have no doubt that individuals could be found patriotic enough to come forward with large sums in support of so laudable an object. Let these photographers (?) make the first attempt, and, if successful, we are willing to award them full credit, and to reconsider our determination. Until such step has been hazarded, we certainly do think that a house which has been in existence upwards of one hundred years, and within the last forty years has expended hundreds of thousands of pounds on fostering and encouraging the Fine Arts, and which has moreover employed during that period, with very few exceptions, every engraver of note, should enjoy a right to its own opinion, at least in this matter. We cannot afford to try the experiment proposed; for in the event of failure, we should not so much as get the thanks of the public at large, and most assuredly Government would not grant us a retiring pension. Undoubtedly, if the present system of wholesale piracy is not efficiently checked, the noble art of engraving must decline, if not die out altogether; for what firm will consider itself justified in embarking large sums in the production of such costly works, with a certainty of their cheap re-issue immediately on publication? It will then be left to photographers to devise some means of overcoming the effect of colour in paintings impossible to translate in photography, and of producing by some other means that sharpness of outline which can now only be obtained by copying the engraving, and which varies in exact proportion to the beauty and exquisite rendering of the engraving itself. One more remark in conclusion. You suggest to artists that "a great painting has now a double road to popularity, and that for their own sakes, when they bargain about the engraving of their works, they would do well to make some judicious and liberal arrangement for the sake of the camera." We should like to know what publisher would purchase copyrights under such conditions as you propose.

Apologising for encroaching so much on your valuable space, which can only be justified by the importance of the subject under discussion, we are, Sir, very respectfully yours,

6, *Pall Mall, August 27th.* Henry Graves and Co.

COLOURING PHOTOGRAPHS BY THE AID OF THE PRINTING PRESS.

Referring to the methods recently described in our pages of employing lithography in tinting the backgrounds of photographs, a correspondent calls our attention to an expired patent obtained in 1858 by Mr. Baxter, in which he employs his method of polycolour printing for colouring photographs. The specification, which may interest many of our readers, runs as follows :—

> This invention has for its object improvements in colouring photographic pictures, and consists in combining with photographic pictures the processes of intaglio, plate, and surface printing, and also the processes of lithographic and zincographic printing as a means of colouring such photographic pictures. For these purposes as many printing plates, blocks, or surfaces are prepared as there are intended to be colours or shades of colours printed on a photographic picture, each printing block, plate, or surface being prepared in a suitable manner, to print a portion of the picture with its particular colour or shade of colour, so that when impressions have been taken from all the printing blocks, plates, or surfaces on to a photographic picture, the same will be coloured all over, or to the extent desired. The colours employed may be such as are now ordinarily used in the above-mentioned processes of printing.
>
> And in order that my said invention may be more fully understood, and readily carried into effect, I will proceed to describe the method in which I prefer to conduct the process.
>
> If it be desired to colour photographic pictures by means of wood blocks, I first make a series of dots along each side of the negative picture, allowing at least two dots for each block to be employed in colouring the positive pictures. I then take from the negative photograph on to ordinary lithographic transfer paper as many positive pictures as it is desired to use blocks in colouring, and I then mark or draw on each of these pictures the parts which are to be printed by one of the blocks, and with one of the colours to be employed. This marking or drawing I perform by applying to the pictures, by means of a camel-hair or sable brush, a composition of vermilion, mastic varnish, and turpentine, reduced to the consistency of oil paint. In some cases, in place of printing these photographs on transfer paper, I print them on the common photograph paper, and give them a coating of gum before marking or drawing them, as above described.
>
> The surfaces of the wood blocks to be employed are prepared by coating them by means of a printer's roller with a composition of flake white and gold size. When this coating is perfectly dry and hard, a thin surface of transfer varnish is applied to the block in a similar manner, and one of the pictures, marked or drawn, as before described, is laid on the block, and the marking or drawing transferred to its surface by pressure in a common printing press, such as is usually employed for printing woodcuts. The block is left with the paper upon it, until the transfer varnish hardens, and then the paper is washed off with muriatic or other acid, diluted with a little water applied by means of a sponge, the marking or drawing remaining on the block.
>
> The marked blocks obtained in this manner are engraved by hand in the usual manner, the parts of the blocks which are not marked being cut away. In employing the engraved blocks for colouring photographic pictures taken from the original negative, they are worked in a press such as is usually employed in printing woodcuts, and each with its appropriate colour, and the photographic pictures to be printed are prepared for the purpose of obtaining register by puncturing each edge with a series of holes made by means of sharp point holes being made exactly at the points indicated on the picture by the marks produced by the dots made on the negative. Two register points are fixed in the tympan of the press at a suitable distance apart, and one of the photographic pictures is placed on the tympan, the register points entering two of the holes in the picture, one on each side; the block is then adjusted in its position on the bed, so that it may print on to the picture just in the required position.
>
> When this adjustment is effected, as many pictures as it is desired to colour are printed by the block, care being taken, in laying them on the press, to cause the register points to pass through the holes in each picture corresponding with those through which the register points pass in the trial picture, or picture by which the register was obtained.
>
> Other methods of obtaining register may be adopted, but the system above described is that which I prefer, more especially for the best description of work. In a similar manner the pictures are printed in succession from all the other blocks until the pictures are completely coloured; but I avoid using the register holes more than once, as they are liable to become enlarged by the first use, and if again used, inaccuracy of register might result. In some cases I employ metal in place of wood blocks, the metal which I prefer being that ordinarily used in casting stereotype plates.
>
> To colour photographic pictures by means of intaglio engraved plates, I proceed in the following manner :—I take one of the photographic pictures such as it is desired to colour, and I make from it a series of tracings, one for each colour; these tracings are made usually with a black lead pencil, and each tracing has marked on it all the parts which are to receive the tint, with which the tracing corresponds. Each tracing also has two dots made on it, corresponding with two of the dots on the side of the photographic picture. The tracings being thus prepared, they are transferred on to a series of copper or other plates covered in the ordinary manner with etching grounds or otherwise, the transferring being effected by passing the plate and tracing together between rollers in the usual manner of transferring on to metal plates in copperplate printing. The plates are then engraved at the parts marked by the transfer tracings with fine lines or dots, which in printing serve to hold the colour, or such portions of the surface of the plate are covered by any other description of work usually employed by copper or other plate engravers, according to the taste of the artist, and the register dots are by the graving tool marked on the surface of the plates, and they are arranged to come flush with the general surface of the

plate, and to be surrounded with indentations extending a short distance around them. In printing, the pictures are laid on the plates by causing the points to enter the corresponding holes in the edges of the picture, and the points in the successive plates are so arranged that the register holes are each used but once only. The printing is conducted in the ordinary manner of copper-plate printing.

In order to colour photographic pictures by means of lithographic stones or zinc plates, I proceed by marking or drawing in transfer ink by means of a brush on a series of photographic pictures printed on lithographic transfer paper the parts to be coloured with each tint, and from such marked pictures I transfer, in the manner usually adopted by lithographers and zincographers, on to stones or zinc plates (one for each tint), and with these stones or plates the pictures are printed in succession until they are completely coloured. The register is obtained by laying on the sheet according to marks or dots made on the stones or plates, or by other means usually employed in lithographic and zincographic printing. Or, in place of marking or drawing the tints on to a series of pictures, and transferring them from these pictures on to a series of stones or plates, as hereinbefore described, I make tracings of the photographic picture, and transfer these on to stones or plates. I then make my drawing for the different tints on the stones or plates themselves, by which a better effect can be produced than is attainable by transferring the tints on to the stone or plates.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 5th September, 1866.

I HAVE just returned from travelling over Switzerland, and notwithstanding the continual bad weather that followed me, veiling the horizon, dispelling the effects of light, and concealing from sight the imposing aspect of the glaciers, I yet comprehended the enthusiasm of English tourists for this beautiful country. I was, naturally, pre-occupied during this excusion with my usual subject—photography. Having been impelled to quit Paris, where the Photographic Society takes its holidays, the experimenters shut themselves up in their laboràtories preparing marvels for the approaching exhibition, and those who devote their time to portraits are absent from lack of customers, I have sought on the road whether I could not find something interesting to communicate. Unfortunately, though many operators were to be found among the travellers in the hotels, or upon the roads, more or less difficult of access, in beautiful Switzerland, the rain obliged them to remain inactive, and I could only recognize them by their disappointed looks. However, at Interlaken I perceived two gentlemen, standing like sentinels right and left of a Dallmeyer's or Ross's objective, directed towards the valley of Lauterbrunnen, beyond which the atmosphere was for a moment clear, showing the glaciers of the Monck and the Jungfraü. I hastened my steps towards these gentlemen, and accosted them, hat in hand. A negative sign of the head was the only response I received. I thought they were English, and repeated my introductory salutation in that language. "Ich verstehe nicht!" ("I do not understand!") was the reply. This is the only phrase I know in German. I then found that conversation with the gentlemen was impossible, and, regretting my ignorance of their language, retired, much disappointed.

At Berne, Neufchâtel, Interlaken, and Lausanne, I found well organised establishments for taking portraits, the proprietors of which receive foreign publications, new books published in France, Germany, and England; they are consequently well informed as to the progress of the art. But what surprised me was to see in their show-cases, alongside of their own specimens, which are very good, proofs of Pierre Petit, Numa Blanc, Carjat, &c., &c., with which they can very well dispense. At Geneva, especially, this system is generally adopted. This city contains 47,000 inhabitants, and has at least forty photographers, which is one for every thousand residents. I saw at Geneva, at M. Valten's (the successor of M. Vuagnat, one of the veterans in photography), excellent portraits of the natural size; and at M. Chevalier's, who appears to be the photographer in most repute for portraits, a very remarkable collection of the artistic, scientific, and political notabilities of Switzerland.

What astonished me much was to learn that none of these artists take views, French and English operators monopolising almost exclusively the picturesque riches of Old Helvetia. The stereoscopic views of Messrs. England, Braun, Ferrier, and Soulier, are the only ones to be seen in the shops; and wherever you go—on the steam-boats, in the wild valleys, on the slopes of mountains, at the foot of waterfalls—you will meet young girls, who offer these proofs for sale near on the spot where they were taken. Every place to which the tourist can go, and where it has been possible to erect a châlet, the building is transformed into a sort of shop, in which you see these small views among the thousand sculptured objects made by the country people. I asked several of these vendors, whose proofs sold the best? most of whom replied, "Those of Mr. England." I am happy to say, however, that this popularity does not prevent the success of the various works of other artists.

In concluding this letter, I may observe, that I do not believe there are many countries where photography is so generally diffused as in Switzerland. The reason is doubtless to be found in the fact, that photography alone can represent the grand aspects of that highly favoured country.

ERNEST LACAN.

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Talk in the Studio.

PHOTOGRAPHY AND ETHNOLOGY.—The *Société d'Ethnographie* at Paris have undertaken the publication of a large and fine collection of human types, which will surpass any previous series of the same kind. Each type will be photographed from nature under three aspects—front, back, and profile, all nude. Thirty-three parts of this work have already been issued, and it is hoped the complete work will figure in the great Exhibition of next year.

PHOTOGRAPHIC PIRACY.—At Westminster, Mr. William Bennett, photographer and artist colourman, of Brompton Road, appeared to three summonses taken out by Mr. Graves, the printseller, of 6, Pall Mall, under the 25th and 26th Victoria—the first two for selling pirated copies of "Ordered on Foreign Service," by Robert Collinson, and "A Piper and Pair of Nutcrackers," by Sir Edwin Landseer; and the third for fraudulenty attaching the name of Mr. Graves to a photograph copied from that in the possession of Mr. Graves, entitled, "A Listener ne'er hears gude o' himsel'." Mr. Montague Williams prosecuted. After stating his case, he said persons like the defendant carried on a lucrative trade by selling these rare photographs considerably under Mr. Graves's price. He said Mr. Graves had been at the expense of from £1,000 to £20,000 in obtaining the originals of some of his works. Mr. Graves having proved his copyright, and the registration of the original engraving and photograph, Mr. John Rodwell, his assistant, said he was attracted by a copyright of his employer's at the defendant's shop, and asked if it was for sale. The defendant said it was not his copyright, but if witness took others and paid a high price, he would make him a present of it. He did so. He called the next day and purchased another pirated copy of Mr. Graves's works. He bought other works, and on one, "A Listener ne'er hears gude o' himsel'," was Mr. Graves's name as publisher. He admitted that they were copyright, and explained that caution was necessary to avoid detection. Mr. C. A. Pullen appeared for defendant, who, however, addressed the Court himself, but had in reality no defence, except that he had acted imprudently. He pleaded poverty and other things in mitigation of punishment. He also objected to Mr. Graves as prosecutor in the case using the name at the foot of the photograph, contending that the engraver (Mr. Atkinson) should prosecute. Mr. Selfe overruled the objection. This piracy was done for gain, and in a shabby manner; in fact, it was reaping the benefit of Mr. Graves's enterprise and capital in which he had been put to great expense and risk. He inflicted three full penalties of £10 each and £3 3s. costs. In default of distress the imprisonment will be three months.——Mr. Edward John Lorberg, of Brompton Road, was also summoned for selling a pirated copy of "Ordered on Foreign Service." In this case the guilty knowledge was very clearly proved. Defendant kept a cutler's shop, and sold these photographs privately. This one was "given away" because others were paid a good price for. There was no defence. The defendant was fined £10, and one guinea costs.

The Quekett Microscopical Club.—The Committee of this Club have issued their first report, from which it appears that their progress and success have been most unequivocal. The number of members is nearly two hundred, all interested in the progress of microscopical science. The meetings are held monthly throughout the year at University College.

Submarine Photography.—*Le Génie Industriel* states that for the last twelve or fifteen years M. Bazin has been actively and unremittingly engaged in bringing to maturity a variety of mechanical inventions. The question of electrical illumination has occupied a considerable share of his attention; and he has recently succeeded in applying it for the purpose of illuminating the bottom of the sea and deep rivers, with the object of taking accurate soundings, and also of discovering the exact localities and positions of sunken vessels. In order to effect this preliminary reconnaissance, M. Bazin descends in what he terms his "photographic chamber." The greatest depth hitherto ventured upon averages from 230 feet to 270 feet, and he remains there for the space of about ten or eleven minutes, quite a sufficient space of time to enable him to take a photograph of the whole area embraced by the rays of the electric light. The chamber is simply a box constructed of strong sheet iron, braced with transverse stiffeners on all sides, and in which the occupant remains absolutely hermetically closed up. Thick lens-shaped glass windows afford every facility for discovering whatever is lying *perdu* in the depths below, and at the same time obviate all risk of giving way under the pressure of the circumambient fluid. The photographic views exhibited by M. Bazin have proved thoroughly satisfactory in respect to clearness of outline and accuracy of definition, thus affording all the data necessary for successfully undertaking the raising of the objects whose situation has been previously ascertained.

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To Correspondents.

A. H.—Mr. England's Swiss views may be obtained of Marion and Co., Soho Square.

Alpha.—The tendency to pinholes may arise from a variety of causes. It is more apparent in negatives than positives, for two causes: In the first place, the spots are often so minute that they do not show much by reflected light, and hence are not noticed in the positive, even when present; but spots not noticeable by reflected light in a positive will sometimes be very apparent when viewed by transmitted light in the negative, and will also show in the print produced from such negative. Again, pinholes are produced in the negative by prolonged intensification. Whenever they are present, the simplest cause should be examined first; that is, the presence of excess of iodide of silver in the bath. The mode of examining, and also of applying the remedy, we have often described. 2. A "mottled appearance" in a negative may proceed from various causes; but the most likely is the use of a collodion too thick and glutinous, which gives a mottled, irregular film. 3. Glasses for negatives should be absolutely clean. New glasses may be cleaned with a little alcohol and tripoli; glasses which have been used should be cleaned with dilute nitric acid, followed by the alcohol and tripoli. 4. If your silver bath be alkaline, add a drop of nitric acid to a pint of solution; if acid, add a few drops of a ten-grain solution of bicarbonate of soda. If you do not find it work satisfactorily after this treatment, add the soda solution until the silver bath is made decidedly turbid, then expose it to strong sunlight for a few hours, after which filter, add a trace of nitric acid, and try again.

H. J.—It will not be prudent to use the albumen solution after it is decomposed. The addition of ammonia aids in preserving the albumen. Mr. Mudd recommends that it should never be used when more than a month old.

C. Taylor.—The colour of a developed print depends much upon the time occupied in developing. A fully exposed print, rapidly developed, is generally of a warm tint; whilst a print which has been less exposed, and requires prolonged development to bring out all the detail, will generally be of a black tone. Prolonged development, and the free use of silver, will generally secure deep tones. The use of a trace of citric acid in the developer retards the development of even a well-exposed print, and tends to produce a black tone. The use of a large proportion of chloride tends to produce a warm tone; the free use of a bromide, a bluish tone; and the free use of an iodide tends to a greenish black tone. A little gelatine, about half a grain per ounce, added to the salting solution, is a good sizing preparation.

F. M. L.—You will learn all details of the prices of albums for cabinet portraits of Messrs. Marion and Co. The price to be charged must depend on circumstances. As a rule, we recommend that they should be charged in each establishment just twice the price charged in the same establishment for cartes. If they become a fashion—as we believe they will—they may afford an opportunity for those who have been foolishly tempted to reduce the price for cartes too low, to retrieve their position, and once more secure fair prices. We cannot tell whether your half-plate lens will answer or not; but you can easily try it. Both full-length figures, three-quarter lengths, and vignetted heads may be produced on this size, and all look well.

R. M. F.—The portable camera for stereoscopic pictures, and for pictures 7½ by 5 inches, which we designed some years ago, we prefer still to any other. It is light, convenient, and efficient, packing also into very small space. Since we first suggested it, it has undergone many improvements of detail, applied by Mr. Meagher, who manufactures it. We do not remember the price.

M. D.—You will find much less tendency in your plate to dry, if you keep the dark frame a little damp. If it have been put away in a dry place for some time, it rapidly absorbs moisture when brought into use again, and so dries the plate. A piece of wet blotting-paper at the back of the plate is a good thing; a damp cloth wrapped round the whole back, except when it is in the camera, is a good thing. To avoid the stains described, let the plate rest upon pieces of clean blotting-paper, and frequently wash the inner frame.

J. R.—It is found by many photographers an economical and convenient plan to cut the prints to the proper size, and shape before toning or fixing, as the prints are then more manageable, and more silver is saved from the clippings, whilst the gold in the toning bath is not wasted by being precipitated on the black edges of the prints, which, of course, use the most gold. It is a good plan, in any case, to cut off these bronzed edges before toning. The print enclosed is poor in tone, chiefly because the negative is poor. Unless a negative be sufficiently vigorous to permit a deep reduction of silver to be reduced in the blacks in the operation of printing, no amount of toning will give a good rich deep colour.

W. R.—Bichromate of potash is a much more sensitive agent than bitumen of Judæa, and has almost entirely superseded the latter for application in photolithography. Your question as to which is the best process of photolithography is difficult to answer. We have no hesitation in saying that the best method is that in which a transfer is used in preference to working on the stone; but as to details of formulæ and manipulation, comparatively few minute particulars have been published. Mr. Osborne's articles, and Mr. Lewis's, published in our back volumes, give the best information.

Lex.—The photograph should be registered before any copies are sold. It is prudent to register a print from every negative. A case has been lost because the print only of one of the negatives of a pair taken at the same exposure was registered. Registration enables you to secure the copyright in your own photographs of the subject, but it does not prevent any one else photographing the same subject. The print of an engraving you enclose is a piracy. The law forbids the gratuitous circulation of such piracies, as well as their sale.

Focus.—You may produce the effect intended by M. Claudet, by either moving the body of the camera, or the rack and pinion. You must first ascertain the exact range of motion required, by focussing for the two extreme points—say the nose and the curls at the back of the head—marking the position of the lens or camera for each, and then, during exposure, allow the motion to extend over the distance included within the two marks. Of course care must be taken to avoid general shaking.

B. B.—The process of mezzotint engraving is too lengthy to describe here. We may just briefly state that a plate of copper is first covered all over with a grain or roughened surface, which enables it to hold ink. If printed from in this state it would give a universal deep black. The process of engraving chiefly consists in scraping smooth the portions intended to be light in the picture; the smooth portions hold no ink, and hence produce lights. 2. George Morland's "Preparing for Market" is an old engraving, of which the copyright is expired. Such engravings sometimes possess especial value from being scarce. Whether this print is scarce or not, we are uncertain, but we certainly should not think it worth anything like the sum mentioned. 3. The "Slide" and "Football" are, we believe, copyright prints. An English copyright does not prevent a picture from being copied in Germany, as we have no copyright in that country; but the sale of German copies of English copyright works is piracy, and liable to be punished. It is, of course, difficult for persons not familiar with the business to know what is copyright and what is not. As a general rule, you may assume that most modern pictures are copyright; and another general rule, you should beware of German copies of English pictures, as the majority of them are piracies. In a few instances publishers of engravings have lost the claim to copyright from inattention to the provisions of the law; but of late years, since the introduction of photography, they have been very careful. 4. We shall be glad to hear more of your dry plate operations.

L. D. (Brighton).—Immersion in the bath before the film has so fully set will sometimes remove the tendency to greasy repulsion; moving the plate up and down in the bath all the time of immersion will sometimes assist; sometimes the addition of a drop of distilled water to an ounce of collodion will assist; and sometimes nothing but the use of a less repellent collodion will answer. 2. There is no mode of obtaining a list of registered pictures, except by going to Stationer's Hall and copying it from the books, which would be a most serious task. As a rule, you should be chary of copies from photographs.

Several Correspondents in our next.

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Photographs Registered.

Mr. J. Bateman, Canterbury,
Four Photographs of the Bishop of Dunedin
Mr. W. T. Deane, Richmond,
Photograph of Prince de Condé.
Mr Thos. Annan, Glasgow,
Photograph of J. Noel Paton, Esq.
Mr. Austin H. Clarke, Ripon,
Two Photographic Groups of Princess of Wales, &c.
Mr. P. Skolan, Cheltenham,
Photograph of J. Francillon, Esq.

THE PHOTOGRAPHIC NEWS.

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CHEAP ART AND PHOTOGRAPHIC PIRACY.

Our repeated condemnation of photographic piracy has been so explicit and emphatic that we do not for a moment imagine that any argument in its favour can by possibility be drawn from our remarks on what we believe to be the impolicy of art publishers. To avoid the chance of any misconception, however, we have one or two more words to add on the subject, and we at the same time call the attention of our readers to a letter, on another page, from an esteemed correspondent, who urges with much force some arguments similar to those of Messrs. Graves and Co., as to the interests of engravers and publishers in the matter in question.

We once more repeat, that it may be admitted without reserve that publishers of engravings have a perfect right to conduct their own business in their own manner; that they have a perfect right both to repress the publication of photographs of their works, and to decline to issue such photographs themselves. We mentioned some considerations in our last which were worthy attention, we thought, as inducements to undertake such publications; but we did not for a moment doubt their right to act on other conclusions, still less did we imply that there was the slightest palliation for piracy. We wish to be understood on this subject. We are anxious that all interested in the art of engraving or in the publication of its results should well understand that respectable photographers have no sympathy with piracy, and that they protest against the stigma which such practices casts upon their art. But it is on the question of policy we conceive the print publishers to be in error. We maintain our conviction that the issue of small and cheap copies of fine engravings would not seriously injure the sale of such engravings. Whilst in a few instances the possession of a photographed copy might be a sufficient reason for not purchasing the engraving itself, we believe that in a greater number of instances the circulation of the small copy would serve as an advertisement of the original, and thus increase its circulation. The purpose of the photograph and that of the engraving are essentially different: the former is only suited for the portfolio and the scrap-book, whilst the engraving is suited for framing and hanging. Few persons would hang up a photographed copy of an engraving, if the original, generally larger in size and finer in texture, were accessible.

We have no desire to see the beautiful art of engraving die out. We learn with regret its depression. But if, in the course of the inevitable economic changes brought about by the advancement of science, that art be to some extent superseded by the more rapid and less costly method of reproduction furnished by photography, we should be glad to see those whose knowledge of art and experience in its dissemination, derived from connection with engraving, give them both a claim and a fitness, amongst the earliest to profit by the production and circulation of photographic copies of pictures. We believe that photography is destined to assist materially in popularizing art, and, without anything of the cant of elevating the poor to which our correspondent refers, we are anxious to see such a consummation. If our conjecture is right, why should not art publishers assist in and profit by the work?

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ALLEGED PICTURES PRODUCED BY LIGHTNING.

The production of images of objects—generally trees—on the bodies of persons struck by lighting has been so frequently recorded, that the belief has become pretty general that such pictures are due to something analogous to a photographic process. One difficulty in authenticating such cases arises from the fact that the person so struck is often killed, the images are necessarily seen by a few persons only (these rarely scientific observers), and the body is then buried. Even in the cases where the lightning-struck person survives, the case is not much better, as the *cutis* of a living person is not often a suitable object for scientific observation. A very simple mode of avoiding these difficulties is, however, possible. It would be easy, in most cases, to secure a photograph of such an image which would admit of careful examination and of comparison with the original object of which it is supposed to be a portrait, impressed by the lightning. We commend this suggestion to the attention of those who may have opportunity of preserving this kind of record of any of these cases, so frequent during the seasons when thunder-storms are common.

We quote two instances which are stated to have occurred within the last week or two. The Paris correspondent of a daily contemporary, describing a recent devastating thunderstorm, says:—

> In the Vosges two travellers sought refuge under a linden tree, which was struck by lightning; they both fell, and when picked up and stripped, were found to have facsimiles of the linden leaves on back and thighs. "The *fact* is confirmed by the Mayor of Bergheim." These Promethean gentlemen should show themselves with their linden leaves, and a certificate from the mayor to prove the authenticity of the tattooing.

A Manchester paper mentions another case. During a late thunder-storm, two boys had taken refuge under a large tree:—

> They had not been long in shelter when a vivid flash of lightning illuminated the atmosphere, and the lads were more or less stunned by the force of the shock. The electric fluid seemed to have circled round the tree in a curiously serpentine fashion, and, what was still more singular, was the fact of one of the boys (Edwards), who had been seriously affected, presenting on his left side the the perfect image of a tree, the fibres, leaves, and branches

of which were represented with photographic accuracy. The impression of the tree was reproduced in a less determined form on the lad's right side—that which it would seem had been less exposed to the pewer of the lightning; but both pictures graduated from the knee, terminating and joining at the apex of the chest. Jones appeared to have had a still more narrow escape from death, as the destructive fluid was attracted by his scarf-pin —which was twisted in an extraordinary manner—and traversed his person, scorching him severely.

Professor Tomlinson, of King's College, an exceedingly careful and acute observer of physical phenomena, in a letter to the *Times*, which we subjoin, points out the probability that these images are simply the arborescent forms common to all lightning figures, a subject to which he has given considerable attention. He says:—

Every summer we read paragraphs in the papers respecting the wonderful effects of lightning in producing on the skins of persons struck by it an "exact portrait" of the tree under which they have taken shelter. In your impression of to-day, a case is stated as having occurred at Whalley Range, near Manchester, in which the lightning produced on the body of a boy "a perfect image of the tree" under which he stood, "the fibres, leaves, and branches being represented with photographic accuracy."

Statements of this sort are so numerous that M. Baudin, in his *Treatise on Medical Geography*, proposed a new term—namely, Keraunography ("to write with thunder"), to include these and other figures caused by lightning; and M. Poey, in a treatise published in 1861, collects 24 such cases, and seeks to explain them by a real photo-electric action, in which the surface of an animal is the sensitive plate, the tree the object, and the lightning the force that impresses it.

It would be easy to show that these ramified figures are sometimes produced on the bodies of men and animals when no tree is near; but so strong is the notion that the lightning impresses the portrait of a tree on the animal, that a tree from a distant wood is sometimes made to do service, as in a case noticed in a report of the British Meteorological Society for 1857. One or two medical men, who have observed such cases, refer these figures to an eruption of blood into the vessels of the skin, producing an effect similar to that of an injection. About two years ago, a case was reported in the *Lancet*, in which ramified figures were traced from the trunk down both limbs of the patient, so regular as to lead to a conviction in the mind of the medical man who wrote, that the phenomenon must have been regulated by some fixed law.

In dealing with such statements as these, we must of course admit that a figure more or less minutely ramified is often found on the body of a patient struck by lightning.

It is not generally known, however, that such a figure is really produced with every flash of lightning and with every discharge of a Leyden jar. Most scientific men are aware of the fact, and that such figures can be made visible. If a thin sheet of window-glass, about four inches square, be held between the knob of a charged jar and the discharging rod, the discharge will pass over the surface nearest the jar, turn over its edge, and so get to the discharging rod. On holding the glass up to the light, no trace of the discharge will be seen; but on breathing upon the glass we get a remarkable, ramified figure, consisting of a trunk, from which proceed a number of branches, covered with minute spray, the whole figure presenting a striking resemblance to a tree. In some cases, the discharge bifurcates, and even trifurcates, when we have two and three trunks, each accompanied by its own branches and spray. Should the glass be too thick, the charge will not pass; but we get some of its minor details, such as the branches and the spray, representing, in fact, those ramifying feelers sent out by the electricity to prepare the line of least resistance along which the principal discharge takes place. These are the lines which produce the sensation of cobwebs drawn over the face, which sailors describe as the forerunners of the ship being struck. In the experiment just noticed, the discharge burns away portions of the organic film which covers all bodies exposed to the air, and the breath condenses in continuous streams on the portions so burnt and rendered chemically clean, while on other parts of the glass the breath condenses in minute globules.

In a paper read by me before the physical section of the British Association at Manchester, in 1861, I attempted to show that the ramified figures so often observed on the bodies of animals struck by lightning are not derived from any tree whatever, but represent the fiery hand of the lightning itself. I exhibited some of these figures, as produced by the discharge of a Leyden jar, and it was generally allowed that the resemblance to a tree was sufficient to lead an ordinary observer to connect the ramified figure found on the body of a person struck by lightning with the tree under which he sought refuge.—I am, &c., C. Tomlinson.

King's College, W.C., Sept. 8.

CANADIAN SPORTS IN THE CAMERA.

Under the head of "Out-door Photographs taken in the Studio" we gave in our issue for June 1st a brief account of a series of hunting scenes, illustrating Canadian sports, produced by Mr. Notman, of Montreal, which, whilst bearing every impress of the wild landscape scenery in which the cariboo is hunted, were really produced in the studio, the effect being obtained by the skilful use of real and artificial accessories.

We have recently received from Mr. Notman a series of these photographs, entitled "Sports, Pastimes, and Pursuits of Canada, photographed from Nature," and we must pronounce them in many respects the most remarkable series of photographs we have ever seen. The boldness of the conception, as well as the completeness with which it has been carried out, exceed anything of the kind that we have met with. The effect of wild landscape scenery, with foreground and distance admirably rendered, and the adjuncts of hunting life, trees, tents, thickets, game, &c.—many of these depicted under the varied effects of snow-storm, daylight, and night time, all produced in the studio of the artist—is something as startling in its novelty as it is successful in result.

The pictures before us are ten by eight in size, and are at once excellent examples of photography and admirably composed pictures, as well as daring photographic novelties. They comprise illustrations of moose-hunting and of cariboo-hunting. The latter include some of the most startling and successful effects, and of these, by far the best pictorially, and the most extraordinary to attempt by photography, is entitled "Exhausted." It depicts a snow-covered landscape with bleak, wintry sky, and low-lying clouds, and a heavy snow-storm raging, the air being filled with flakes of snow, which are driven slant-wise by a rough blast. In the midst of this scene are two figures in hunting costume, wearing large Canadian snow-shoes. One of them is quite "exhausted," and has dropped down on the snow beside a stunted tree or bush: he is evidently sinking into that fatal sleep which overtakes the wearied and benumbed traveller who yields to the depressing influence of fatigue and extreme cold. His companion, himself heavily laden, is just removing the package containing, we presume, the huntsman's travelling kit, from the shoulders of his prostrate companion, both wanderers being covered with the snow, which falls pitilessly around them. Mr. Notman has before attained great success in rendering snow effects, some very fine examples of this kind having been exhibited by him, if we remember rightly, in the Exhibition of 1864; but nothing of the kind we have ever seen before approaches this in reality of effect or pictorial completeness.

As a contrast to this, we turn to a picture named "The Camp Fire." Here the scene is just outside the tent. A group of five huntsmen is seated around a camp fire, which is only perceived by its effect on figures around it, giving flickering bright local lights, and sharp, black, weird-looking shadows, the scene, generally, being wrapped in gloom, the portion of the figures turned from the fire being dimly made out, as are also a few branches of trees of the forest, and the snow-shoes, &c., scattered around. Gloomy as is the scene, the camp fire casts a cheery light on the faces, to most of which the soothing pipe gives an air of contentment. This photograph, also, unmanageable as the materials seem, is admirable in pictorial effect.

Amongst the illustrations of moose-hunting, that named "The Death" is perhaps the most perfect. As a pictorial composition it is very good, the distribution and massing of light and shade being exceedingly fine. The moose has been shot, and an old huntsman is just cutting off its magnificently antlered head. The grouping and expression of the figures are excellent, and the management of the masses of dark foliage against the wintry sky, and of the snow-covered foreground, the effect of which is carried off by the light hunting-dresses, are all exceedingly fine. "Night:

Asleep in the Cabane" is another night scene, with sleeping huntsmen and sleeping sentinel scattered round. "The Breakfast" is another scene in the "cabane," which gives a glimpse of the attempts at domestic life during hunting. The "cabane" is a kind of enclosure or screen, made of young trees and underwood bound together so as to form a screen or shelter. The rifles, snow-shoes, leggings, gloves, and other wrappings are hung or scattered around, whilst the breakfast, of primitive simplicity, is enjoyed. All the other scenes, including "Game in Sight," "Sunday in the Bush," "The Return," &c., are good. In all, the perfect *vraisemblance* of the effect of bush-scenery and hunting-life is admirably preserved. In all, the pictorial arrangement indicates the control of a fine taste and artistic judgment. The photography is, throughout, exceedingly good.

The Photographic News for June 1st contains a diagram illustrating the kind of lighting employed in producing these pictures. The last number of the *Philadelphia Photographer* gives the formulæ which Mr. Notman employs in his regular operations. There is nothing especially novel therein, but as it is generally interesting to many to know the precise details of the method employed by the ablest artists to produce the best effects, we repeat the details here. We may especially call attention to the sentence in which Mr. Notman endorses the dictum we have often enforced; namely, that full exposure and avoidance of over-intensification are the great secrets of delicacy and perfect gradation. Mr. Notman says:—

I send you my formulæ for taking negatives and printing. I doubt not many of your readers will find nothing new; but success, I think, does not depend upon catching novelties, but rather on the careful application of well-proved processes, using the best materials, and studying, as far as opportunity occurs, the principles of art from books, paintings, engravings, and, above all, study from nature. Many photographers, I believe, pose and otherwise arrange their sitters with scarcely a thought of the final result, and, when the finished print is attained, do not look for what constitutes its beauties or defects, that they may in future secure the first, and avoid the latter.

To secure the effect of atmosphere and space, with that delicate rounding of each part, it is necessary to have a full exposure; and in developing, care is required not to carry the intensifying too far. In my own practice, the negatives produced may be called quick printers, with considerable half-tone; but such negatives require great care, both in printing and toning, particularly the latter, for if the toning is carried beyond a certain point, the prints are apt to have a flat, grey appearance; so in toning we seek a rich, warm tint.

Negatives—Formula.

Nitrate Bath.

Water	1	ounce
Nitrate of silver	40	grains.

Iodize with iodide of potassium, and slightly acidify with nitric acid.

Developer.

Water	1	ounce
Protosulphate of iron	30	grains
Acetic acid, No. 8	1	drachm
Alcohol	1	,,

Intensify with

Pyrogallic acid	1½	grains
Citric acid	·1	grain
Water	1	ounce,

Adding to each dose, before putting on the plate, a few drops of—

Nitrate of silver	20	grains
Water	1	ounce.

Fix with a saturated solution of hypo. Varnish with shellac spirit-varnish.

Printing Solutions—Sensitizing Bath.

Water	1	ounce
Nitrate of silver	30	grains
Lunar caustic...	2	,,
Alcohol	1½	drachms

Float two minutes; fume fifteen minutes.

Toning Bath.

Water	210	ounces
Acetate of soda	1	ounce
Bicarbonate of soda	¼	,,
Nitrate of uranium	16	grains
Chloride of gold	12	,,

Keep twenty-four hours before using. When about to use, add (say) eight grains more of gold, and keep adding according to the quantity of prints.

Fixing.

Twelve minutes in hypo. One ounce to water 4½ ounces.

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PURE WATER.

BY WILLIAM CROOKES, F.R.S.

The paramount importance of pure water is now fully admitted. From an indifference, almost amounting to apathy, on the important subject of our water supply, the public mind appears in danger of running into the opposite extreme, and there is some danger that, in the panic with which all London is now seized, the authorities may be coerced into an act of Vandalism, and drain our beautiful lakes of Cumberland and Westmorland for the purpose mainly of watering the roads and flushing the sewers of London. Using such large quantities of water in their various operations, and requiring this water to be of unexceptional purity in certain respects, photographers are more interested than most persons in the present excitement, and especially so in the subject of organic impurity, about which everyone now talks so much and knows so little.

We will dismiss, as of very minor importance, the inorganic impurities of water. They are seldom or never present to an injurious extent in the water supplied to large towns, and it is, indeed, a question amongst physiologists whether their presence in drinking waters does not do more good than harm; considering the large quantity of potash, soda, and lime in the human organism, it is probable that the introduction of these bodies in the water we drink, even adds to its nourishing properties. One exception we must make, and that is to the presence of nitrates. These, however, are not so much dangerous in themselves as in their history. Nitrates in water are the product of decomposing organic matter, and are thus the concomitants of disease and death, which may be lurking unsuspected in the crystal-clear, and sparkling well water.

How do the impurities get into water? The answer is obvious. The inorganic impurities are dissolved from the soil and strata through which the water percolates; whilst the organic matter is derived in a very small degree from the vegetable matter of the soil, and in a very large degree from the decomposing animal matter contained in sewage. The former contains no nitrogen, and is comparatively harmless. Tourists in mountainous countries know well the flavour of peat with which the becks and tarns are impregnated, and although this water is largely drunk, we have never heard of its being followed by any injurious action. The latter impurity—that derived from decomposing animal matter—is of a different nature altogether. It contains nitrogen, that most inert of elements in the free state, but most potent in combination; and the effect of its introduction into the human economy may be attended with the most serious results. It is scarcely possible to imagine how ordinary London well water can ever be safe from such contamination, consisting, as it does, of surface drainage, which has soaked through the few unpaved spots in the metropolis, and mingled in its downward passage with the leakage of the thousand and one sewers of underground London: it would be as deadly a draught as any which could be concocted in the chemist's laboratory, were it not for the wonderful disinfecting powers of the earth through which it has passed, which oxidizes the nitrogen into perhaps its most harmless compound, nitric acid. But the oxidizing power of the soil, great though it be, may be pushed too far; some of the nitrogenized matter may escape this process of natural disinfection, and the results will then be of that fatal nature which have given so terrible a notoriety to the Broad Street pump and the East London water supply.

The soil is not the only disinfectant employed by nature. Water itself in sufficient quantity has great oxidizing powers. When the sewage of a town flows into a river, and samples of the water are taken at different distances from the outlet of the sewer and analysed, it is found that the organic impurities gradually become less, and the nitrates increase in quantity, in proportion to its distance from the inflow of sewage, until at ten or fifteen miles away the nitrogenous impurity becomes imperceptible. This is occasioned by the action of the oxygen which the water dissolves from the air. The flowing water exposes a large surface to the air, and, by its rolling movement, being in a state of churning, is constantly drawing into itself fresh supplies of atmospheric oxygen and mixing it intimately with the organic impurity. Few organic bodies can resist the action of dissolved oxygen, and thus it is that a moderate amount of sewage poured into a river has little injurious action.

With stagnant water, however, the case is different. Here no movement takes place to break the scum which forms on the surface; no purifying atmosphere penetrates through this coating; and the nitrogenized organic matter present, instead of oxidizing to nitric acid, carbonic acid, and water, changes, under the influence of its innate putrefactive tendency, to poisons of the most potent description, ready, at any moment, to fill the air with the seeds of malaria or typhus.

It is, however, questionable whether ordinary organic matter, even though nitrogenized, is capable, when imbibed with water into the system, of acting as the poison of a contagious disease; for this something more is wanted—the body must be organized and possess vitality. An ordinary chemical poison is innocence itself as compared with the tremendous energy of the virus of infectious diseases, and there is this radical difference between them, that whilst a poison, in the act of killing, appears to use itself up, and be thereby rendered incapable of further mischief, the organized virus of infection kills, and, at the same time, infects with its own multiples all the juices of the animal body, so that each victim that it slays, multiplies its powers of evil a million fold. This power is only possessed by a body having vitality, and having analogous properties to the cells of yeast, or, more strictly, to vaccine lymph.

How the first organized germ of cholera poison got into circulation in London during the recent outbreak will probably never be known, but its subsequent multiplication and diffusion will occasion no surprise. From all that can at present be ascertained, it appears probable that the original cause of the outbreak only lasted for a few days, and that the continuance of the plague has been owing to the repeated multiplication and subdivision of this germ in its passage through the different victims.

There is one thing which must be prominently borne in mind during the continuance of the present outbreak of cholera. The deadly agent will apparently do its work when present in such minute quantity as to be imperceptible to ordinary observation, and scarcely to be detected by chemical tests; whilst it is even doubtful whether the most carefully selected filtering materials will afford hindrance to the passage of the virus. It becomes, therefore, imperatively necessary that all persons who use water for drinking or other domestic purposes, or in photographic operations, should adopt for the detection and destruction of this poison, the most effectual means which recent chemical researches have placed at their disposal.

It is therefore proposed in a future article to continue this subject, and describe the various means of detecting the presence of organic matter in water, of destroying its poisonous character, and of rendering it fit for domestic or photographic use.

Stray Papers on Photography.

No. 5.—SKY.

BY NELSON K. CHERRILL.

In my last paper I considered one of the most difficult subjects as well to the artist as to the photographer, one which has up to the present time baffled the power of either, but one in which the photographer has in his mechanical art a technical advantage over the other.

In the present paper, which will be devoted to the consideration of sky in its pictorial relations to photography, I shall be treating of a subject in which painters can far excel the finest efforts ever yet put forth by the photographer. This we know should not be. Painters ought not to have any chance against photographers, who have the power of rendering with absolute accuracy the complicated twists, and turns, and wreaths of each tiny cloudlet that forms a part of the whole grand arrangement in any picture. Surely, if truth in matters of art is of any importance or consequence, photographers have it absolutely at their command when treating of such a subject as the sky, in which the colours are almost all eminently suited for photographic representation, and in which but a comparatively small range of gradation presents itself.

These remarks, however, lead me to an observation of great practical moment from the photographic point of view. It is this: provided the sun's disc is not apparent in the picture, it is, as a rule, impossible to tell in a photograph of clouds from which way the light comes. That this is true, practically, I could bring many photographs to prove, from which it would be seen, that though the clouds had proper shapes and good gradation of light and shade, no one could tell from which way the light came.

The reasons of this at first somewhat curious phenomenon are evident upon a little consideration: they are these.

1st. Owing to the extreme brilliancy of the illumination under which most clouds appear, and also owing to the tenuity of the vapour of which many of the lighter forms of them consist, it is almost impossible to render in any photograph the minute difference (one which is almost, if not quite, invisible to the eye) of light between the most brilliant and the less illuminated portions.

2nd. Owing to the fact that most clouds are—to some extent at least—translucent, and that above them the sky has an equal illumination, it is just as likely as not that the light and shade of any cloud from which the position of the sun might be determined, may be altered, or even reversed, by the simple fact of its varying in thickness.

3rd. Owing to inequalities in the formation of some kinds of clouds, they not unfrequently present their darkest sides to the direction from which the light actually comes. This is more especially the case when the sun is at a low altitude, or when two or more strata of clouds overlie each other, with some clear space between them. The effect is, of course, produced by the direct light being confined to only one part or side of the cloud.

These considerations will, I think, show that under most circumstances (of course allowing for a few exceptions) it does not much matter where the sun is when a cloud negative is to be taken; in other words, almost any cloud negative will do for any particular landscape, *as far as the lighting is concerned.*

I have of late been noticing a phenomenon which has attracted my attention in relation to the general direction of clouds. I have noticed it so often that I venture to remark upon it, that others who take any interest in the subject may look out for the same appearance. I observe that (I do not say as a rule) very often, when the clouds are small enough to have any general direction in their lines, they point to two poles in the heavens, one of which is, in almost every case which I have noticed, very near where the sun sets; from this point the clouds will, with of course a few exceptions, stretch over the sky, uniting again in a similar pole 180°, or thereabouts, from the first. The arrangement is somewhat like that of the "gores" of a balloon when seen from the inside. I do not know whether I am not mistaken in this appearance being so often seen as I imagine; it may be somewhat exceptional, but I can state that I have seen it nearly every third day when the clouds have been small enough. For two days the arrangement remained unbroken, and the effect was so decided that others have had occasion to remark upon it.

Clouds should, to obtain their maximum of pictorial effect, be made an essential part of the picture into whose composition they enter. Their form, number, and general direction or tendency, should be such as to supply some place left in the composition of the picture in which they will be required.

Clouds are not merely useful and good because white sky in a photograph is generally considered bad; they cannot be successfully added to any picture where they are not wanted either to give softness and delicacy to distance, or relief and vigour to foreground; or, what is very often much more important, to give repetition to some prominent form, or to carry on the leading lines of the picture in a manner which cannot otherwise be secured.

I have said that clouds cannot be put with any degree of success where they are not wanted. In cases where the composition of the picture is complete without clouds, their only effect can be to detract from the merits of what they are intended to improve. It is worse than useless to cram the only available space in a landscape with uncalled-for "accessories."

To enter into the consideration of the repetition of the forms of the principal objects in the picture, or of the way in which clouds may aid in producing this and similar effects, would lead me into a long disquisition upon the "art" questions of selection and treatment, which would be quite beside the point of the present paper. Suffice it for the moment to state, that the law of repetition is one of the most important in its relation to the production of artistic pictures; its effect being to give the feeling of general calm and quiet.

A few words on the practical part of the business must close the present paper.

I have before had occasion to observe, that it very seldom happens that the clouds are at their best when the plate is being exposed. Very often there are no clouds, and when there are any, they are not unfrequently of the wrong shape, or else they are moving too fast to be taken with any but a very short exposure; so that from these causes, or, perhaps, most of all, from the blundering way in which some people use their developing solutions, clouds are but rare in single negative pictures. Of course it is, or would be, much better to get them at once on the same plate with the rest of the picture, as then the printing is very much facilitated, and the thing is a great advantage for those who want large numbers of prints. The best way, when the clouds are right, is to use a shade for the sky while the foreground is doing, for which purpose a piece of black paper is almost as good as anything; it may be held close in front of the lens. It is not, however, easy to do any good in this way, but its simplicity is a recommendation. If Mr. Johnson had not got a patent for his pantascopic camera, the split shutter which he uses might be adopted with very great advantage; it is the most ingenious thing ever invented for giving a difference in the length of exposure between the top and the bottom of the plate. As a very general rule, however, clouds must be "printed in" from another negative. I have tried many ways of doing this, and have found but one that is really satisfactory. The sky of the landscape negative must be quite opaque, so as to give a white print. The clouds must form a very thin negative, one through the densest part of which you can almost see to read a book or print. The print can be placed in the desired position on this negative without any trouble, and then all that is necessary will be to shade with a roughly-torn piece of paper the landscape part of the print, while the sky is being printed in. Some little care may be needed to prevent a certain darkening of the outline of the horizon, but after a very little practice this will be avoided, and the joint may be effected in such a way that none can tell where it is made.

Where any very dark object runs up into the sky of the picture, and the clouds are only of a light colour, they may often be printed right over the dark part without showing.

I consider that five minutes is the proper time to take in the printing-in of an ordinary sky; some may take a little more, perhaps, but not much, I think.

I said the negative containing the clouds must be thin. There are three reasons for this, which it will be well to give:—

1st. That it enables the print to be laid on the negative, or rather the negative to be laid on the print, with great ease, and in exactly the right position. It is a great nuisance to have to hold both the negative and the print up to the light, to determine when they are in their right positions. The thinness of the negative, also, by showing where the landscape part of the picture begins, renders it very easy to use the shade or mask.

2nd. When the clouds are taken on a negative which is too dense, partly from the reasons mentioned in the last paragraph, and partly from others which are obvious on a little consideration, the cloud negative must be "stopped out," so as to print white where the landscape occurs; this, besides the difficulty it presents, and the amount of time that it wastes, produces an effect in no way to be compared to that produced by the former method.

3rd. As the scale of gradation in clouds is, as a rule, but small—that is, as there is not much contrast between the lightest and darkest parts—it is a mere waste of energy and good silver to make the negative of the usual printing density.

But I find I have spun through my space, and so must leave for a future time a few remarks on Artificial Clouds, and how to make them.

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PRINTS DEVELOPED WITH FERROSO-ACETATE OF IRON.

BY M. A. GAUDIN.*

This process, reposing upon the assertions of the author himself, is not yet perfect, and is suitable only for amateurs. There are still difficulties in the way which are not easy to overcome. The first requisite to success is to obtain a paper quite or almost impermeable to fluids, so that the image may be impressed and developed on the surface of the paper, and not in the body or mass. The paper is made sensitive by sponging over its surface quickly and energetically an acid solution of nitrate of silver. This operation is performed in open daylight, for as long as the paper is moist it is not sensitive. Nitric acid is employed to acidify the solution of nitrate of silver. Paper thus treated is hung up to dry in the dark room. It must be *perfectly* dry before it can be used, because any irregularity in this respect would produce irregular patches in the development. Furthermore, the sensitized paper will not keep longer than a few hours, because time effects, in some way or other, the same result as an exposure to light, which the author supposes to be the dissipation of the nitric acid in the silver solution.

A very short exposure is all that is required; one second about in sunlight, and from ten to twenty seconds in diffused light. Artificial light, too, the author has employed with success. The image, after exposure, is sometime visible, of a yellowish red colour. This faint image, it appears, is afterwards completely developed with a solution of ferro-acetate of iron and gelatine, to which are added a few drops of silver

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L Lumière.

solution. The author has not been very definite in the preparation of this developing solution; it appears to be a mixture of the per-acetate of iron with a small portion of the proto-acetate of iron. Any amount of intensity can be obtained by adding now and then a few drops of nitrate of silver. The same developer may be used for bringing out the image on the collodion. The author remarks as follows :—

"If inert per-acetate of iron be added to the silver bath which is used for sensitizing the paper, the latter assumes a slightly yellow tinge; but such paper is just as sensitive to light; and the latent image thus produced is endowed with the peculiar property of being brought out to a certain extent by being simply breathed upon."

The sensitising or silver solution must contain a liberal proportion of nitrate of silver, and be rendered quite acid; the greater the quantity of acid the longer the exposure.

The developer which is best suited for the purpose has a reddish colour, and when the reduced silver which floats about in the fluid is of a beautiful black, like soot. This favourable condition is obtained by dropping into the developer an acid solution of nitrate of silver until the desired result is obtained; the developer is afterwards maintained in this condition by the immersion of prints to be developed, which continually introduce fresh portions of nitrate of silver.

Finally, nitric acid is found to be the best agent, both in the sensitising bath and in the developer, for preserving the whites pure and for producing beautiful blacks; a slight excess of acid nitrate of silver being indispensable in order to obtain pure blacks.

In order to have pure whites, the sensitised paper must be dried in a perfectly dark room, and the prints must be developed by the aid of non-actinic light. It is well, also, to develop the prints only to a sepia tone, and then, after a thorough washing in order to remove all free nitrate of silver, to intensify the image with a developer containing a large amount of nitrate of silver.

If the whites are at all affected, they may be brought again to a state of purity by immersing the prints in a solution of sulphocyanide of ammonium or potassium five per cent. strong, and made slightly acid with nitric acid.

The author promises to prosecute his researches in this direction, and we shall not fail to let you know the result.—*Humphrey's Journal.*

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THE NEGATIVE FOR THE COPYING AND SOLAR CAMERA.

BY PROFESSOR TOWLER.*

Many operators cannot comprehend that the same negative which will produce a faultless print on paper, will not, in like manner, produce a similarly good and irreproachable print on glass, or on paper in the solar camera; it is difficult to convince them of the contrary, because they do not or cannot comprehend the reason. Now the proverb says, "A word to the wise is sufficient for them;" and it becomes a pertinent question to ask how many words will be sufficient for those who are not wise; for our reiteration of the same instruction, time after time, seems absolutely necessary to guide several of our brethren in the right path.

The difference between a negative for ordinary printing on paper and for one designed for the copying camera (the solar camera is also a copying camera in which condensed light is used) is simply this: the former negative has an extra coat or layer of intensity; it is, in fact, twice as opaque in the shades as the latter negative. If it were less opaque, the direct rays of the sun would penetrate those layers of opacity, and soil the paper beneath. But the lens itself acts like the extra layer or coating of intensity; it performs the same office exactly; it impedes, it stops the light in its efforts to get through the glass, from getting through the remaining thin shades of the negative. Glass may be made of such a thickness as to prevent any light whatever from being transmitted, and it can be made so thin as scarcely to be distinguishable from air, and in this form absorbs very little light. These being facts, then, there can be no difficulty in forming the conclusion: the thicker the glass the greater the difficulty for light to pass through it.

You see now why the shades of the negative, why the negative film, as a whole, must be thinner for solar camera operations than for ordinary printing on albumen paper.

But the next conclusion we have to draw is this: The same amount of relative contrast, of brightness and sharpness, must exist in either negative. We must not comprehend under the expression, *thin* negative, *weak* negative. A weak negative is one obtained from an object uniformly illumined with a weak light; and by a thin negative we mean one which has been taken of an object lighted up with a bright light in happy contrast of light and shade; but the negative film is altogether more transparent than the ordinary negative. Leaves, trees, houses, etc., can be easily distinguished through the densest shades, and yet after all the negative is sharp and bright.

Such a negative is not exactly an Ambrotype, because it is not necessary to develop an Ambrotype so long, in order to bring out all the detail required to be visible by reflected light, as is required to be shown by transmitted light. This is the only difference between a good Ambrotype and a solar negative.

In order, therefore, to accomplish these two conditions, thinness, bright and complete detail, we must go to work with forethought.

To obtain the first condition—thinness—we naturally make the collodion film thinner by diluting it with an addition of the solvents of soluble cotton; namely, ether and alcohol. Thus we devise the following formula :—

Collodion for Solar Camera Negatives.

Alcohol	4 ounces
Ether	4 „
Iodide of cadmium	16 grains
Bromide of ammonium	10 „
Pyroxyline	24 „

This collodion will flow over the plate almost as easily as water, without leaving a line or reticulation in the film when it is dry. This is the sort of film we require.

In order to attain the second condition—bright and complete detail—we must expose as long as for an ordinary negative certainly, and very probably a little longer.

Why longer?

Take two silver baths for sensitizing paper; the one contains thirty grains of nitrate of silver to the ounce of water, the other contains ninety grains. On the latter bath the albumen paper is sensitized completely in one minute, whilst in the weaker bath it has to be floated at least three minutes to produce the same effect.

Just so in the exposure: when the bromo-iodizing solution is weak, the time of exposure must be comparatively longer than when it is strong.

But why make it weak?

We know of only one reason. It is this: the less the relative quantity of the bromo-iodides in an ounce of the solvents, the greater the probability of their being *totally dissolved*; and hence, the less probability of being troubled with pinholes in the film after development and fixing.

This is a serious trouble at any time, but especially when it is present in a solar negative. It is a general fault to bromo-iodize too strongly. It is much better to use a strong silver bath rather than a strongly bromo-iodized collodion.

You know the reason now of our proceedings so far. But if the bath is really stronger than usual, the time of exposure need not be changed. In fact, there is no need of any further change in any of our proceedings subsequent to the *proper* sensitization of the film, and the *proper* amount of exposure required by any negative. If the exposure be incomplete, the detail in the negative will be incomplete anyhow, whatever the developer may be.

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* *Humphrey's Journal.*

But there is a choice in our developer. The plain protosulphate of iron developer is a powerful reducing agent, and is apt to fog the sensitized plate, even if it has not been exposed at all. It must, therefore, be restrained in its action; and the best restrainer for the purpose, as far as we know, is the happy combination of gelatine and acid first recommended by M. Carey Lea, Esq. But our friends will say: "We want none of your collo-delevopers that require so much fixing: give us something else."

DEVELOPER FOR SOLAR CAMERA NEGATIVES.

Protosulphate of iron...	1 ounce
Rain-water	16 ounces
Acetic acid	3 ,,
Nitric acid	16 minims
Alcohol	2 ounces.

The development of a solar camera negative requires the utmost care. Pour a sufficient quantity of the developer upon the plate, holding the spout or edge of the vial close to the collodion film; do not let it run over the plate, otherwise you lose all the benefit of the free nitrate of silver that was left on the plate, and which mixes with the portion of the developer that first goes over it. As soon as all the detail is out, and before any signs of fogging appear, drain off the developer and wash the plate. The moment the picture is complete, the negative is complete; and any further action of the developer would merely thicken the deposit without improving the negative. Wash and fix as usual, but do not varnish the film, as every little particle in the varnish produces a perceptible speck in the enlarged print.

The negative we have just described is required for making transparent positives, by which duplicates of negatives of any size can be obtained as good as the original, and sometimes better, because the original negative can be touched up, corrected, and printed with a vignette or matt of the size and shape which you want the print on paper subsequently to possess. It is used for making transparent stereographs on glass; for producing beautiful opal or porcelain pictures by the wet process; and, finally, for making enlarged copies on paper by means of the solar camera.

Without a good negative, a proper negative, such a one as we have described, you cannot possibly obtain good positives, either on glass or on paper; it would be loss of time to attempt it.

Mark our last observation:

You can read print through the densest shades of a solar negative; but you cannot read print through the densest shades of an ordinary negative. Place the negative close up to the eyes when you perform the experiment, and withdraw your head to the proper reading distance.

SOLAR PRINTING PROCESS UPON IODIDE AND BROMIDE OF SILVER.

BY LEIGHTON PINE.[*]

IN working this process all the precautions required in the case of collodion negatives, to exclude white light, must be taken, or fogginess will be the result.

NEGATIVES.—We prefer negatives with rather more intensity than is generally used for solar printing, when working this process, and make them as follows:—

The regular negative bath, collodion, and developer are used, and the plates receive the usual exposure in the camera. The developing operation is not continued quite as long as contact negatives, and the fixing is done with cyanide potass. The collodion film may be protected with a solution of gum-arabic or diluted albumen.

IODIZING THE PAPER.—Heavy Saxe paper is best adapted for this process. The iodizing solution is prepared as follows:—

Water	1 ounce
Iodide potass	6 grains
Bromide potass...	4 ,,
Cox's gelatine	1 grain.

Soak the gelatine in the water for an hour, and then dissolve with *heat*; let cool, add the iodide and bromide, and filter through paper twice. Brush this solution over the paper, and hang the sheets up to dry. When dry, preserve them between the leaves of a portfolio, to keep them from the air. The paper should not be kept longer than a few days before using.

SILVER SOLUTION.—After adjusting the focus of the camera, tack on the paper, and brush over it a solution made as follows:—

Water	1 ounce
Nitrate of silver	30 grains.

Dissolve and set in the sun-light until it blackens and clears up, filter through paper, and add a few drops of glacial acetic acid.

EXPOSURE.—Expose the paper to the action of light until the *very faintest* impression of the image in its deepest shadows can be seen. This will take from fifteen to sixty seconds, according to the intensity of the negative and brightness of sun-light.

DEVELOPING.—After exposure, lay the paper on a sheet of glass, and brush over it quickly the following solution:—

Water	8 ounces
Pyrogallic acid	8 grains
Acetic acid, No. 8	1 ounce.

Filter through paper. (In winter, the quantity of pyro. acid may be doubled.) The image will instantly appear, and as soon as dark enough, wash quickly under a tap of water, and immerse in a fixing bath of hypo. soda, about the strength for fixing albumen prints. Leave the prints in the hypo. until they appear of an uniform colour by transmitted light, after which wash well, in order to free the paper from hyposulphite, and dry.

The tone of prints fixed in this manner is not very pleasing to the artistic eye, being of a foxy red colour; but their stability is unquestionable.

The tone of the prints will be much improved by fixing them in an old fixing bath, formerly used for albumen paper; but the stability of the prints, under unfavourable circumstances, will not be so great as when fixed in a new bath.

Prints upon iodide and bromide of silver can be changed to a very handsome colour by adding a few drops of sulphuric acid to the fixing bath. The action of this bath is continued until the prints assume the desired tone. The change in the colour of the prints is due to the action of the acid on the hpyo. soda, which, by continuing with it, liberates sulphur; and the prints, instead of being toned, as many suppose, simply undergo a sulphuretting action.

We know that prints made on chloride of silver, if fixed in a bath containing sulphur and emitting a strong smell, are sure to fade. This is also the case with prints made on iodide or bromide of silver, though they do not fade as fast as when made on chloride of silver, in consequence of which fixing baths containing sulphur, though they greatly improve the colour of the pictures, must be avoided when undoubted permanency is desired.

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[*] *Humphrey's Journal.*

THE DRY COLLODION PROCESS.

BY M. A. MIALARET BACKNELL.*

According to my own experience, the great difficulty in working the dry collodion process consists in the development of the negative; that is, the inability to develop the photographic image uniformly and rapidly. This is, no doubt, in some measure owing to the impermeability of the dry collodion film to the solution used for developing, and it is, therefore, necessary to restore the film to a moist, gelatinous state, in order that it may be more readily acted upon.

This may be easily effected in the following manner:—After exposure to light, the plate is taken out of the dark slide, and a second film of iodide of collodion, very much diluted with alcohol, is poured upon it. It is then plunged into the silver bath, where it is allowed to remain for five minutes, or till the greasy appearance on its surface has totally disappeared. The plate is then taken out and developed in the ordinary manner, the operation being proceeded with with the same speed and regularity as if it were a negative produced by the ordinary wet process.

It is absolutely necessary that the collodion should be well diluted with alcohol, or the original film will be dissolved, and the photographic image thereby destroyed. The collodion employed by me was the same as that used for producing the dry film, and I dilute this with alcohol till I am assured of its being unable to dissolve, but simply to moisten the dried collodion. I have no doubt that unsensitized collodion, much diluted with alcohol, would likewise answer the purpose; but as I am not at present in possession of any in its normal condition, I have been unable to make the experiment.

Whether this mode of proceeding is new I cannot say, at it is impossible for me, in such an out-of-the-way place as Louisiana, to remain well informed of all the doings of the photographic world; but I have not remarked anything of the kind in such photographic journals as I have seen.

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Scientific Gleanings.

Oxygen Extracted from the Air.—Mons. Tessié du Mothay has invented a process for obtaining a supply of oxygen from the atmosphere, which he proposes to show in operation in the Exhibition of 1867. The process is stated to be extremely cheap, and adapted to the production of gas on a large scale. Permanganate of soda is the agent employed. A solution of this salt is placed, under proper conditions and at a suitable temperature, to be traversed by a current of air, by means of which the oxygen of the air is seized upon by the solution, and the nitrogen is set free. When sufficiently saturated with oxygen, the current of air is replaced by a current of steam, which, without decomposition, drives off the oxygen almost absolutely pure. The permanganate solution, which by the condensed steam has become diluted, is then concentrated by the addition of fresh salt, and the operation repeated.

Patents.—It appears, from the report of the Commissioners of Patents, that in the year 1865 there were 3,386 applications for patents, and 2,186 patents in fact passed the seal; rather more than a third of the applications were not proceeded with. Of the patents actually sealed, about 70 per cent. became void at the end of the third year by non-payment of the £50 stamp duty then payable, and about 90 per cent. of the remainder became void at the end of the seventh year by non-payment of the £100 stamp duty then payable to secure the patent for a second term of seven years. The receipts of the Patent Office in the year 1865 amounted to £115,340.—*Journal of the Society of Arts.*

Purification of Water.—A plan has just been patented by Mr. Alfred Bird, of Birmingham, for purifying water taken from rivers, ponds, tanks, and wells. It is based on the affinity which hydrated alumina has for organic matters, in combining with them and rendering them insoluble. The action is as follows:—One part of neutral ter-sulphate of aluminium in solution is added to 7,000 parts of the water to be purified. As soon as the mixture is made, a cloudy haze is seen in the water, which haze rapidly condenses into flocculi, with little lanes of clear water of the greatest brilliancy and beauty between them. As the flocculi become more dense they rapidly descend to the bottom of the water, leaving it absolutely free from all organic colouring matter, as clear as crystal, and free from taint. The time required for complete precipitation is from six to eight hours; if, therefore, the precipitant be put in over-night, the water will be ready for use in the morning; and as time for the action to take place, and not quantity of water, is the consideration, 10,000 gallons can as quickly be purified by this process as a single gallon. The action is dependent on the fact that the lime which is in solution in the water as a carbonate combines with the sulphuric acid of the ter-sulphate, and forms sulphate of lime. The liberated hydrate of alumina instantly attacks the organic matter, which it renders insoluble, and both rapidly descend to the bottom of the water, with the nearly insoluble sulphate of lime, while the liberated carbonic acid gas which remains in the water imparts to it a sparkling freshness and beauty. As the liberation of the hydrated alumina depends on the presence of carbonate of lime in the water, and as its absence in terrestrial waters is a most rare occurrence, the applicability of this patent for the purification of terrestrial waters may be said to be universal. Mr. Bird states, that in order to test the effect of the precipitant upon very dirty water, a gallon was taken out of the Thames at half-tide, in the centre arch of London-bridge. Into this water was put twenty drops of a standard solution of the precipitant. The water was then allowed to stand eight hours, when it was found that all the filth had settled to the bottom, and the supernatant water was clear, sparkling, and pleasant to drink. To test the superior salubrity of water which had been purified with the precipitant over the same water which had not been so purified, the following experiments were tried:—Into each of three glass jars was poured half a gallon of the purified water. In the first were placed thirty leeches, in the second two splendid gold fish, and in the third a fresh-cut bunch of water-cress, without any roots attached. The experiments were tried in the summer; the glass jars stood in a good light; and it was found that the leeches remained healthy in the water after it had stood eight days; the gold fish lost none of their vigour, though the water was unchanged three days; while the cut and rootless water-cress looked green, and actually sprouted new leaves on the surface of the water after it had stood seven days. The glass jars were now emptied, and half a gallon of the same water, which had not been purified, put into each, with the same leeches, gold fish, and a fresh bunch of water-cress without roots. The glass jars stood in the same position as before, and it was now observed that the leeches on the third day began to die; the gold fish looked sickly on the second day, and it was absolutely necessary to change the water in their jar on the third day to keep them alive; as to the water-cress, on the third day the leaves began to bleach; on the fourth day the stems felt slimy and began to soften; and on the fifth day the jar had an unpleasant smell, owing to the decay of the plant. To test the possibility of there being any organic life left in the purified water, a gallon was put into a glass bottle, and the bottle placed in the sunlight; beside it was placed a similar bottle of water which had been taken from a deep well. In about a mouth the well water showed distinct green patches of vegetable life, while the water which had been purified with the precipitant remained as clear as crystal, and without a trace of vegetable matter, at the end of six months.

Application of Refraction to the Determination of the Amount of a Given Substance in a Given Solution.—Empirical tables having been formed of the deviation caused by the presence of different quantities of a given salt in solution, the solution to be tested is placed in the upper portion of a hollow prism, which has a division in the centre, the lower portion being filled with distilled water. On looking across the prism with a magnifying glass, at a scale illuminated with a salted alcohol flame, the difference of deviation produced by the two liquids can be measured on the scale. Experiments made with sea salt, in this way, have given very accurate results.—*Scientific Review.*

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* *Moniteur de la Photographie.*

Highly Refractive Glass.—It has been found that if the potash or lead of ordinary glass is replaced by thallium, its refractive power is greatly increased. 300 parts sand, 200 peroxide of lead, and 335 carbonate of thallium afford a glass which is perfectly homogeneous, and possesses an agreeable yellow shade. Its specific gravity is 4·235, and its index of refraction for the yellow ray 1·71, both greater than those of any other known kind of glass. Altering the relative amounts of the ingredients is found to give a glass having specific gravities ranging between 4·235 and 5·625, and refractive indices ranging between 1·71 and 1·965. The thallium is better as a substitute for the potash than the lead of the glass. The great specific gravity and high refractive power of thallium glass renders it a valuable material in many cases to the optician and the maker of artificial precious stones.—*Ibid.*

Autography of Speech.—Mr. J. Imray, writing in the *Scientific Review* on the possibility of abridging the labour of writing, says: "Scarcely a quarter of a century ago, when one was told that means had been found of fixing a permanent picture of a human face, a landscape, or even a breaking wave, by the mere exposure of a plate properly prepared to the object, he shook his head in utter disbelief of the fact, however much he was disposed to trust the testimony of his informant. It may be that, before many years have passed, means will be discovered of fixing in like manner a permanent expression of sound. It could not be by photography, for the photograph presents to the eye what was before visible to the eye. Perhaps it will be a process of phonography, which will present to the ear what was audible when the impression was made. Such an invention appears at present to be in the highest degree improbable, but, after what has been done in science and art, who shall say that it is impossible? If, then, the author had only to speak into his *camera* (or whatever other apparatus may be employed in such an art) in order to produce an impression on some sensitive matter, and if those impressions could be reproduced and multiplied, the problem of expressing thought with the least possible labour would at once be solved.

Peculiarities of Acetate of Soda.—The acetate of soda possesses certain peculiar properties, which are well worthy of notice, as being capable of useful application. Thus, while returning to the solid state, after having been fused, it remains constantly at the temperature of 136°·4 Fahr., whatever may be the atmospheric pressure; and hence it affords a fixed point of temperature in the construction or verification of thermometers. If acetate of soda is cooled in an atmosphere saturated with moisture, or in a vessel the mouth of which is less than about 0·4 of an inch in diameter, or, still better, in a capsuled vessel, it does not crystallize even at the freezing-point of water; but, on the contrary, becomes a soft translucid mass, in which are seen large iridescent plates, above which is a small quantity of transparent fluid. If the acetate, in this state, is exposed freely to dry air, or is touched with a dry body, such as a slip of paper, a glass tube, or, above all, a crystal of acetate of soda, it suddenly assumes the crystalline state, and disengages a large amount of heat, in its tendency to reassume the temperature of fusion or crystallization; contracting at the same time to the extent of 17-1000ths of its volume at 32° Fahr. This curious property of acetate of soda enables us, by means of it, to store up and recover solar heat at pleasure. Exposed to the temperature at which it fuses, and which is reached in certain circumstances in the sun, and then cooled out of contact with the atmosphere, it assumes the amorphous state, in which it is always ready to yield up a very large amount of heat, on being made to crystallize by contact with a dry body. Crystallized acetate of soda boils at about 283°. If the boiling is continued until, on account of the salt having abandoned a portion of its water of crystallization, the boiling-point becomes 226° Fahr., and it is then allowed to cool without free communication with the atmosphere, it is modified by the heat; and if then exposed freely to the air, or moistened with a few drops of water, it swells up, in combining with the amount of that fluid required by its ordinary condition, and breaks the vessel, though very strong. This last property is possessed by some other salts. Acetate of soda heated to the melting point, and then cooled without access of air, is very deliquescent in exactly those circumstances in which, in its ordinary state, it effloresces.—*Ibid.*

Correspondence.

SUNSHINE AND ACTINIC LIGHT.

Sir,—"Sunshine not required!" is very often the placard which meets the eye of passers-by in photographers' windows. Now it has often raised a doubt in my mind (being an amateur) if "sunshine" is "required" for portraiture. You will say, certainly not; but the question is, is it for landscapes, architecture, &c.? Having read a good deal in the different journals about distance, being beautifully lighted, splendid shadows, and a variety of other things, in which the sun seemed to be the main cause, I arrived at the conclusion that wiser heads than mine had decreed that it was necessary. Now, Mr. Editor, comes the point which has again raised the doubt. Last week, in looking over the contents of the *Journal of Science*, I saw in it, "De la Rue and Celestial Photography." Of course, having to do with photography, I turned to it. The paper commenced with an epitome of photography, and after mentioning Daguerre, Talbot, Archer, and Mr. Hunt (the last-named gentleman, as the discoverer of the properties of protosulphate of iron, deserves the thanks of all photographers), went on to say as follows, which I give you verbatim:—

"Beyond this (speaking of the discovery of protosulphate of iron), at the second meeting of the British Association at York in 1844, this photographer showed that the chemical changes produced by the sun's rays were not due to their luminous power, but were the consequence of *dark* radiations, for which principles or power he proposed the name of actinism. These researches appeared to confirm the results obtained and the hypothesis propounded by M. Berard in 1812, which were reported upon by Berthollet, Chaplet, and Biot (this directs the reader to a note). To show clearly the great disproportion which exists in this respect between the energies of different rays, M. Berard concentrated, by means of a lens, all that part of the spectrum which extended from the *green to the extreme violet*, and he concentrated, by means of another lens, all that which appeared from the *green to the extremity of the red*. This last pencil formed a point so brilliant that the eyes were scarcely able to endure it; yet the muriate of silver remained exposed more than *two hours* to this brilliant point of light without undergoing any sensible alteration. On the other hand, when exposed to the other pencil, which was much less, and less hot, it was blackened in less than *six minutes*."

Now this, I think, clearly shows that "sunshine is *not* required, and the oft-repeated excuse of the "sun not being bright enough" is *but* an excuse.

Hoping you will not think this too long to be placed in your columns, as it may possibly be interesting to some of your readers, believe me to remain yours truly, H.

September, 1866.

[Your argument is based on a misconception. It is well known that it is chiefly due to the rays at the blue end of the spectrum, and also to the invisible rays beyond. But all these rays come from the sun, and are necessarily more intense in direct sunlight, commonly called "sunshine," than in diffused light, which is sunlight received at second hand by reflection from clouds, &c. Sunshine is not necessary for portraiture; but the reflected light of a bright or sunshiny day is valuable for portraiture. In landscape photography, sunshine is not absolutely required; but the picture taken without sunshine is tame compared with the picture taken in direct sunlight, just, indeed, as the landscape itself is deprived of half its charms when sunshine is absent.—Ed.]

OLEATE OF SILVER.

Sir,—In your valuable journal of September 7th, I read with interest an article on "Silver Soap in Collodion," in which some essays with oleate of silver by Mr. Courtenay are alluded to. In your concluding remarks it is stated: "It is possible, also, that a method of printing may be found by its aid," &c. If you will kindly turn to p. 280 of my little work "Le Préparateur Photographe" (Paris 1864), article "Oléate d'Argent," you will see mentioned a photolithographic process, based upon the employment of oleate of silver, and tried by M. Quaglio, of Vienna. In this paragraph I have also stated that, "applied upon ground glass and placed under a negative, the oleate of silver gives a fine black proof, which can be fixed by diluted hydrochloric acid, followed by hyposulphite of soda. I am, yours, &c.,

London, Sept. 10, 1866. T. L. PHIPSON, PH.D., F.C.S.

[We find, on reference to Dr. Phipson's excellent work, the passage named. We were familiar with the experiments of M. Quaglio in applying oleate of silver to photolithographic purposes; but we did not remember that it had been suggested as a printing agent. Dr. Phipson speaks, in his "Preparateur-Photographe," of the extreme rapidity with which this substance is decomposed by light, and of its probable advantage for photography on metal, wood, and stone. Its solubility in collodion will give great facility in applying it.—ED.]

A FEW MORE WORDS ON CHEAP ART AND PHOTOGRAPHIC PIRACY.

SIR,—It seems that the late proceedings taken by Mr. Graves, the publisher, for the better protection of his copyrights from the photographic poachers, has created a new sensation amongst them, and bids fair to stay what the *Daily Telegraph* terms such "a cheap and delightful dissemination of his property." That paper also says that "a national loss is suffered if free trade be not extended into this department of industry;" but I am at a loss to see the honesty of that description of free trade which permits one man, without any experience, or risk of capital, to avail himself of the skill and enterprise of another, and undersell him by means of his own productions in the same market.

There evidently is an opinion in the photographic world that publishers are daily committing great mistakes, and do not understand their own interests (*i.e.*, from a photographic point of view), because they do not issue cheap copies of their plates, and that the relations between the engraver and the photographer are viewed as positively deplorable for art-education; but the publishers know from experience, that if the public became aware that they had any idea of issuing a smaller or cheaper edition of any one of their plates, that fact would effectually destroy the sale of the original engraving. It is true that several highly popular plates have been re-engraved and sold at a lower price, and have been remunerative, but not until the first plate had been before the public for some years; therefore there is not the slightest doubt that publishers would, in their own interests, produce cheap editions of their plates, by photography or otherwise, if their knowledge of their trade did not teach them that it would be useless, and an injury to the sale of their larger publications.

It is stated that publishers regard the multiplication of photographic copies of an engraving as deteriorating the value of the engraving. Publishers, like photographers, consult their own interests: they *do* consider photographic copies of their engravings an injury to the sale of their property. Photographic copies do not injure the value of the engraving as a work of art, but they lessen the value of it as an article of commerce, by reason of their cheapness. I have daily instances come to my own knowledge where people purchase these pirated copies who can well afford to buy the original engravings, but, as the difference of price is so great, the temptation is equally so; they do not possess sufficient love of art to outweigh the love of cash, and are satisfied to hang up on their walls a cheap and spurious imitation instead of an original.

It is a well-known fact amongst publishers and engravers, that the late unchecked system of piracy has seriously injured the sale of engravings; that some publishers have ceased giving out commissions to engravers for that reason; and many engravers at the present time are without plates to engrave, in a great measure owing to the encroachments of photography.

It is most extraordinary that in so many cases so much is done in the interest of the poorer classes. How often the poor man is used as a peg on which to air the wrongs sustained by particular interests! The advocates of cheap copies of other people's productions appear so anxious all at once about extending "a love of real art among the poorer classes." If these people are in earnest, why do they not act independently and honestly in carrying out their philanthropic desires? Nothing is more simple than to pursue the same plan as that adopted by the publishers. A copyright of one of Sir E. Landseer's pictures may be secured for about £500; it may be engraved for about £1,000; it will perhaps require all the skill and industry of the engraver, the result of the study of his life, to engrave the plate; in about two years it will require, perhaps, another £500 to properly advertise and perfect, before it is ready to issue to the public. Now who will do this, and sell photographic copies of it at a few shillings a-piece, for the love of Art in the so-called interests of the poorer classes, who don't buy them?

So the copyist, who is a mechanic, waits until the engraving is published; he risks nothing; he neither possesses nor requires any knowledge of art; he even depends upon the skill of the optician and the cabinet-maker for the success of his negative from which he prints his pirated copies. He then floods the market by means of hawkers and others, thus surreptitiously scattering broadcast through the land these "beautiful but wicked photographs," as they are mildly termed, for his own particular benefit; and this is called a "cheap and delightful dissemination of property." The publisher is indirectly censured for claiming the protection the law gives him to secure, as well as he can, the reward of his enterprize, and the propriety of conducting his business in his own way is questioned on the score of popularizing works of art in the name of those who are really not the purchasers of them.

If cheap art is in demand, any one who walks through London must see that there are to be had everywhere cheap, unfading impressions of engraved plates from nearly all the eminent painters of the English school. Some of the best works of Landseer may be bought for a few shillings, quite enough to afford art-education for the poor man; but these do not satisfy the photographic philanthropist; he requires new publications, just out, because they find a ready sale, and consequently are more profitable.

As an engraver, I have good reason to know of the injury that my profession has sustained by these kinds of reproductions, and I am very glad to see that the disseminators of cheap art will of necessity have now an opportunity for directing their energies into other channels, without borrowing the productions of others. W. T. DAVEY.

STRONG DEVELOPERS AND PROCESS-MONGERING.

DEAR SIR,—If you think it worth your while to insert this in your valuable journal, I should feel greatly obliged, as it may perhaps save some of your readers' time, and possibly money. Last Saturday morning an individual called on me that I purpose calling Process-Monger, who represented that he had made a great discovery of a new developing solution. He had with him some very good photographs that he pretended were taken by him by his new process in less than half the usual time of exposure.

Now, sir, I should not have listened to him a moment, but he also produced a great many testimonials which appeared to be genuine; some of them purported to be signed by gentlemen well known, and of high standing as photographers. He offered to show me the whole process for 50s.; therefore, not wishing to lose the opportunity of any improvement in the art, or to throw away my money, I invited him into my studio to test the process, which appeared to depend upon the developing solution. I prepared a plate, and exposed it less than half the necessary time in a stereo camera, and then divided it in the centre, where it had been previously marked with a diamond. I developed my half with a rather strong iron solution, such as I use in dull weather, as it then was; Mr. Process-Monger then used his own wonderful solution. They were very much under-exposed, and had the usual dull and flat appearance resulting from under-exposure and over-development, but I think his was a little the best of the two, which I considered very bad ones. Of course I was not satisfied, and dismissed him. Shortly after he was gone, my assistant discovered he had left a little of his solution in my measure glass. Upon examination, it appeared to be a very strong iron solution, with a large quantity of acetic acid. I at once prepared a solution of that description, exposed, and divided another plate in the same way, and have enclosed the results, which are what might have been expected. No. 1 was treated with the Process-Monger's solution; No. 2 with the solution I made. They were exposed twelve seconds in very dull, rainy weather, using Dallmeyer's carte lenses with No. 2 stops.—Yours very respectfully,

September 11th, 1866. A Man of Kent.

[Both the cards are good; that produced with our correspondent's own strong solution is perhaps the best of the two.—Ed.]

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Photographic Notes and Queries.

The New Method of Obtaining Depth of Focus.

Sir,—In an able comment on Mr. Claudet's paper, you state that you consider Mr. Dallmeyer's new triplet capable of producing that regularity of definition which was suggested by other means by Claudet. I have puzzled myself considering as to whether even altering the focus of the lens in the ordinary way would not produce the same effect, practically, as Claudet's method.

An artist of some little experience myself, I should be delighted to discover a plan of producing a picture which should possess the same amount of sharpness throughout. Any one commencing a pen-and-ink sketch with a very finely-pointed pen, and finishing with a broad nib, would soon perceive the inharmonious effect of having different degrees of definition in the same picture. A difficulty, however, occurs: Would the public like it? Wouldn't the swells miss the whiskers that show every hair, and the ladies the patterns of their laces and plaids? At first, no doubt they would; but at all events I mean trying them. If the system of altering the focus by means of the rack and pinion fails, where could we get the alteration made proposed by Mr. Claudet? Apologising for troubling you, I remain, Mr. Editor, yours very truly,

Henry Wilcox.

60, *Park Street, Bristol, September 6th*, 1866.

[The distribution of focus may be obtained by altering the focus of the lens in the ordinary way. You must first ascertain the extent of movement necessary, and then take great care to avoid shaking the camera. The portrait triple which you state you have procured will, however, give you considerable distribution of focus, when used with full aperture. Should you find it insufficient, you may then employ the plan described by Mr. Claudet.—Ed.]

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Talk in the Studio.

Photography in the Louvre.—M. Le Comte de Niewerkerke, Superintendent of *Le Beaux Arts*, has caused to be fixed in the galleries of the Louvre the following decree:—"The Senator Superintendent of the Fine Arts, believing that the permission to photograph in the galleries of the Louvre is acknowledged to be injurious to the preservation of the memorials, the photographers using the greatest carelessness in their operations, in spreading in the rooms (which they regard as studios) corrosive substances, which spoil the inlaid floors and staircases, gives notice that, from the 1st of August, the permission to photograph in the galleries is withdrawn without exception, and until fresh orders."

Photographing the Mammoth Cave.—Mr. Charles Waldack records, in the *Philadelphia Photographer*, his experiences in photographing the interior of the celebrated Mammoth Cave of Kentucky, by the aid of the magnesium light. The Editor of the *Photographer* describes the results as the most wonderful photographs he has ever seen, although they are regarded by Mr. Waldack as merely preliminary and experimental pictures. He intends to proceed again shortly, and secure from fifty to a hundred negatives of the magnificent rock and caves and giant stalactites within this mammoth cavern.

Photography amongst the Red Indians.—Mr. Ridgway Glover communicates to the *Philadelphia Photographer* some interesting experiences in photographing the red man of the forest. Some of the Sioux, he says, think photography is "pazuta zupa" (bad medicine). Others have an impression that they will die in three days if they have their portraits taken. Mr. Glover was generally able, however, to convince them that no harm would ensue, and succeeded in obtaining many good portraits and groups.

The Value of Photography.—Sir David Brewster, in an article in a contemporary on the claims of science, literature, and the arts to national recognition and support, claims for the majority of important modern discoveries a university origin. He says:—"The art of photography, too, one of the finest inventions of modern times, is an emanation from a University. It was the science acquired by Mr. Fox Talbot, in Trinity College, Cambridge, that enabled him to convert a rude experiment into one of the most useful and fascinating of the arts. It is difficult to estimate the advantages it has already conferred on science and art, and to anticipate the social purposes to which it may yet be applied. To the fine arts it has been a generous friend. The arts of architecture, sculpture, and painting have in every age called into exercise the highest faculties of man. Fostered by power, consecrated by piety, and endeared by affection, their choicest productions have been preserved by the liberality of individuals and the munificence of kings; and the palaces of sovereigns, the edifices of social life, the temples of religion, the watch-towers of war, the obelisks of fame, and the mausolea of domestic grief remain unscathed, but by time, to attest the genius and taste of their founders. To the patronage of such noble arts the piety, the vanity, and the holiest affections stand irrevocably pledged; and we should deplore any discovery, or any tide in the nation's taste, that would paralize the artist's pencil, or stay the sculptor's chisel, or divert into new channels the genius which wields them. Instead of superseding, however, the arts of design, as some have feared, photography will supply them with perfect copies of every work of art, ancient or modern, with studies of drapery and of figure, and with scenes in life and nature, which, if they possess at all, they possess imperfectly, and without which art must be stationary, if it does not languish and decline."

Desolated Venice.—Describing the deserted, desolated condition of Venice at present, before its cession to Italy is completed, G. Augustus Sala, writing in a daily contemporary, says:—"I escorted a lady to the first photographer in Venice to have her carte de visite taken yesterday, just to see how she looked after three months' solitary confinement, but I was warned to give the photographer twelve hours' notice of our coming, that he might get some collodion, and chemicals, and things together. With the exception of an Austrian major, remarkably like a grizzly bear in uniform, he had had nobody to sit to him for seven weeks. There is another photographer in St. Mark's Place who announces in his shop window that all customers purchasing views of Venice to the amount of two pounds shall have a right to have their portraits taken, with a dozen copies, for nothing. Yet even with this tempting bait he has had nobody to demand gratuitous focussing."

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To Correspondents.

Nemo.—The new triple you have purchased is decidedly the best lens for the group and college. The other you mention is very slow, we understand. 2. We presume that the convulsive twitching which you describe as following the injunction to the sitter "to keep quite still," is an involuntary nervous affection produced by anxiety to avoid motion. We conceive it to be a great error with many photographers to first weary the sitter with much re-arrangement of his position, and then worry him with many injunctions as to his expression, sitting still, &c. All this invests the matter with an amount of anxiety which defeats its own purpose by often causing involuntary movement, and still more frequently a constrained position. 3. The reason people say that they "want their portraits especially good, because they want them to give away," is, we suppose, because a present should always be the best of its kind. A good pear is a better present than a bad pineapple. 4. The reason why, in a portrait group consisting of mother and child, the mother is sure to move in the one picture in which the child is still, is one of those things which, as Dundreary says, "no fellow can make out." 5. The reason why sitters so frequently ignore the placarded requests to pay at the time of sitting, arises, we presume, from a somewhat natural indisposition to pay for a thing until it is delivered and ascertained to be satisfactory. In places of public amusement no one dreams of refusing to pay before passing in and taking a seat; but a formal system of taking the money and giving a check at the door is carried out. If a somewhat similar plan were adopted in photographic establishments, and as soon as a given style of portrait were decided upon in the specimen-room, the order were entered in a book, and a duplicate, with acknowledgment of receipt of payment, were handed to the sitter before he proceeded to the studio, in nine cases out of ten the money would be paid without hesitation. The affair would assume an air of order and routine which few people would dispute. When the sitter is asked for the cash just as he is going away, and sometimes asked with hesitation, with a consciousness that some discussion may arise on the subject, a very large proportion of customers will be disposed to answer, "I shall pay when I receive the portraits."

Kent.—Ordinary printing negatives are, as a rule, too dense for enlarged camera printing on opal glass. But if the gradation and definition are good, it is quite possible to get good results by a little management. If the negative be very dense, the tendency in camera printing is to give intense contrasts. To avoid this, give plenty of exposure, and use a freely bromized collodion. By the use of a little skill and judgment, a soft print may be obtained from a dense negative, and a vigorous print from a weak negative. Flooding the plate with a large quantity of the developer, so as to dilute the free nitrate of silver present as much as possible, will also tend to diminish the excessive vigour often resulting from camera printing with a dense negative. The especial object of Mr. Blanchard's plan was to get rid of much of the coarseness attendant on enlarged negatives. In the usual method of producing first a slightly enlarged transparency, and then a further enlarged negative, there are two sources of exaggerated imperfection: there is, first, a magnified image of any spot or defect in the original negative; and then, in the final negative, an exaggeration of any spot or defect in the transparency. In Mr. Blanchard's plan of reducing the final negative from a very large transparency, the second series of defects, if there are any, are diminished rather than enlarged.

C. B.—It is very probable that the gelatine contained some trace of chloride, as most samples do; but a nitrate bath containing pure gelatine would darken if exposed to light. Try the addition of a few drops of a solution of chloride of sodium, which will throw down a precipitate of chloride of silver, and probably carry with it much of the colouring matter, so that after filtration your bath will be found clear. It is probable that it will be necessary to add a little nitrate of silver to repair the loss. The print enclosed is very good. Perhaps a trifle longer exposure would have brought out more fully the detail in the upper part of the foliage; but the photography is, as a whole, good.

Wm. Furling.—Thanks for the interesting specimens. The process is very ingenious. We fear that we cannot help you in the sale of the process, having no connection ourselves with the commerce of photography. The process would be more valuable if it were directly applicable to paper. Have you tried it on black paper or card?

Kafoozelum.—It is very probable that houses of two stories high within twelve yards of your studio will intercept some light, but that you cannot help, we presume. We should certainly extend the window as marked, from six feet to ten feet long, and if possible extend it at the top, so as to make it a continuous light with the skylight. Remove the ground glass certainly, and, unless you wish to prevent persons overlooking you, replace it with plain glass. If that is not convenient, use corrugated glass, which will, if fine and clear, interrupt much less light than ground glass. The house is somewhat low; but that you cannot conveniently help at present, we imagine. Forty seconds are too long for a sitting at this season of the year, when the light is good. If the lens be a good one, less than half that should be sufficient. The presence of nitric acid in the bath, in using bromo-iodized collodion, will interfere but very slightly with rapidity; and if the collodion be freely bromized, a large proportion of nitric acid may be employed without loss of sensitiveness. The use of albumen as a preliminary coating to the plates is dangerous to the bath, although if used very dilute it is possible that it may be employed for some time without appreciable injury.

J. M. Y.—As a rule, the obliteration of distance is due to over-development or over-intensification. It might be produced by over-exposure; but it is more frequently due to under-exposure, which renders necessary prolonged development. Your own experience confirms this. You state that on developing a dry plate by alkaline development the distance is indicated, but is obliterated in the process of intensifying; it is probable that in such case intensifying was carried too far. 2. Fothergill plates may be developed by the alkaline method, but it is attended with difficulties and dangers which render it undesirable. It is very apt to produce stains and fog. 3. Most of the accounts we have heard of the results of the resin process, as stated by Mr. England, have been very favourable. Have you added the extra proportion of bromide to the collodion you mention?

Tyro.—Of the shilling manuals, that of Mr. Hughes is one of the best; "Practical Photography," in two parts, published by Negretti and Zambra, you will find good. Towler's "Silver Sunbeam" is very good and comprehensive. You will find much information and valuable statements of processes in our Year-Books.

F. W.—It is probable that your bath is double the strength necessary for the kind of paper you are using. In such case, the very great excess of free nitrate would be a fertile source of rapid discolouration. Most samples of albumenized paper in the market at the present day are weakly salted, and do not require strong silver baths. The grey-looking spots are due to the uneven draining of the excited paper, some portions of the silver solution standing in drops instead of draining evenly away. This is generally caused by the paper being very dry and horny, and so having a tendency to a greasy, repellent surface. Apply a sheet of clean blotting-paper to the wet surface of the excited paper, almost immediately after removal from the surface of the bath, which will remove the trouble of the spots. Add to each pint of the exciting bath 5 ounces of water and 5 ounces of alcohol (methylated will answer). The use of alcohol will materially assist you in getting rid of discolouration.

A Learner.—When using a bromo-iodized collodion, you may add sufficient nitric acid to the nitrate bath to turn litmus paper quite red, without danger. Nitric acid in the bath is very fatal to sensitiveness when a simply iodized collodion is used; but when a bromide is present, the acid may be used freely without danger. The fog which comes from want of acid in the developer, and that which is the result of want of acid in the bath, produce very similar results; the former, however, is more apt to be superficial fog, easily rubbed off. 2. In neutralizing the bath with a solution of carbonate of soda, test-paper is of no service, as great excess may be added, and the test-paper show an acid reaction produced by the carbonic acid liberated from the carbonate of soda. The only mode of ascertaining when sufficient has been added, is to add a little at a time, shaking the bottle well between each application. When it is observed that a milky turbidity is produced, which does not subside in a few minutes after shaking, it is an indication that the acid is neutralized, and that a precipitate of carbonate of silver is beginning to be formed. 3. The common washing soda may be used, but it is better to employ the bicarbonate, as the other often contains impurities. A creamy film is due to two causes; the presence of sufficient pyroxyline and sufficient iodide in the collodion. Sometimes the addition of a grain or two of extra pyroxyline to each ounce of collodion will effect a great improvement, securing a creamy film and a dense negative without any trouble. The collodion you mention is generally considered to give dense negatives very readily. You will not gain any advantage by leaving the plate in the bath beyond three or four minutes. Sometimes allowing the film to set too much before immersing the plate is a cause of thin-looking films. Be careful, in developing, not to drive the free nitrate of silver off the plate by dashing the developer on in such a manner as to make it run over the edges of the plate. This is a fruitful source of want of intensity. 4. We cannot account for your difficulty in toning, if you make the solution according to the formula you name. Possibly your chloride of gold is very acid, in which case add some powdered chalk to the solution. Possibly you touch the solution with fingers which have touched hypo: this will spoil it. Try washing the prints less before toning, or not at all, and wash well before immersing in the hypo. A strong silver bath would not cause slow toning.

C. W. H.—Swan's carbon printing, and Woodbury's photo-relievo printing, are essentially different. In Swan's carbon process a sheet of tissue prepared with gelatine, pigment, and bichromate of potash, is exposed under a negative, and the image afterwards brought out by warm water. In Mr. Woodbury's photo-relievo printing, a metal intaglio is obtained, which is a transcript of the negative, and the impressions are obtained by means of a small printing press, a translucent ink being employed. You can purchase specimens of both; of Mr. Woodbury's, by sending to 60, Market Street, Manchester; and of Mr. Swan's, by sending to Mosley Street, Newcastle-on-Tyne. The latter is more suited to the purposes of an amateur, and gives magnificent results.

Wm. Sturgeon.—There is no doubt that the large photographs to which you refer are produced direct from large negatives. They are probably produced by the wet collodion process direct on large plates. Of course, skill and experience are required to produce such pictures, and lenses of sufficiently long focus to cover properly the very large size employed.

J. Picker.—We do not remember the address of the manufacturers of the memorial mount you enclose. Should we ascertain, we will forward it to you.

E. D. Lyon.—The series of views in the Neilgherries are very fine indeed: the only drawback is, that they have not names appended, to add to the interest of the picture. We think it is very probable that such views would sell in England, but our experience does not enable us to speak with authority on the subject. We think it very probable indeed that a photographer with sufficient skill to produce such pictures would succeed in this country. The portraits are good, but the landscapes are better You will doubtless gain in rapidity by changing your house from the tunnel form to the ridge-roof. The figure of the man above the Falls would doubtless have been better absent; but, as you state, you could not very well help it. The pictures are, however, exceedingly good, and admirable examples of work of the wide angle lens.

N.—Thanks for the note and illustrations of weak printing baths. The communication shall appear in our next, with a word or two probably from ourselves on the subject.

Several Correspondents in our next.

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Photographs Registered.

Debenham and Son, Luton, Beds.,
Three Photographs of Miss Hooper.
Mr. J. **Armstrong**, Brampton, Cumberland,
Photograph of Brampton Volunteers.
Photograph of Balter Wille Volunteers, &c.
Photograph of West Wing of Nawarth Castle Courtyard.
Mr. R. **Gillo**, Bridgewater,
Five Photographs of Mrs. Vauderbyl.
Two Photographs of Philip Vauderbyl, Esq.
Mr. A. L. **Garnier**, Guernsey,
Two Photographs of Martin F. Tupper, Esq.
Mr. A. G. G. Ton, Cheltenham,
Six Photographs of Rev. E. Walker.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 420.—*September* 21, 1866.

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WEAK PRINTING BATHS.

The question as to the relative value of weak or strong printing baths has been so frequently discussed during late years, that if the subject were not one of vital interest to photographers they must have been ere this heartily sick of the subject. As, however, it is a question which involves two of the most important considerations, excellence and economy, photographers will not readily weary of it.

Like the majority of photographic questions, it is one which must be decided rather by practice than by theoretical considerations, the latter affording very little aid in arriving at a conclusion. We are not about to discuss the general subject now, or weigh the arguments for and against weak baths, but simply to glance for a moment at the practical facts so far as we have been enabled to ascertain them. Our own prepossession, some years ago, before we had carefully examined the subject, was warmly in favour of strong baths. Our own experience, and that of others whose operations we had opportunity of observing at that time, justified such prepossession; a more extended examination of the subject has, however, materially modified our convictions. So far as we can learn, the almost unanimous practice of extensive practical printers is in favour of moderately weak baths. The term weak is, of course, purely relative; but the meaning it conveys is pretty well understood. For instance, we should call anything under sixty grains of nitrate of silver to the ounce weak, and anything over that proportion strong, in relation to commercial samples of albumenized paper, which often contain from ten to twelve grains of chloride of ammonium to the ounce. But whilst the terms weak and strong are relative, they still bear a somewhat absolute meaning. For instance, a printer who employs a forty-grain bath speaks of this as a weak bath without any reference to the salting of the paper he employs. It is, indeed, taken for granted that the use of a weak bath implies also the use of a weakly-salted paper; and the real question at issue is, as to the comparative advantages of a weakly-salted paper and a weak silver bath, and a highly salted paper and a strong silver bath. When we state, therefore, that in the general experience of practical men weak baths are preferred, we mean that the use of a lightly-salted albumenized paper and a correspondingly weak silver bath are preferred.

We may refer to the practice of some of the most able photographers of the day, by whom the large amount of printing done requires that it shall be effected in the most expeditious and economical manner, and whose professional reputation is a guarantee that nothing of excellence will be sacrificed to economy. We may first mention the practice of Mr. England. His paper is prepared with five grains of chloride of ammonium and five grains of chloride of barium to each ounce of albumen solution, equivalent to seven and a half grains of chloride of ammonium to the ounce. With paper so prepared he employs a forty-grain nitrate bath, one-eighth of the solvent consisting of methylated spirits instead of water. Mr. Blanchard uses a paper containing from six to eight grains of chloride to the ounce, and employs a forty-grain bath. Mr. Frank Eliot, we believe, uses a similar strength; and many other professional photographers whom we know adhere to similar proportions. Others use still less, and produce admirable results, examples of which we see from time to time, with twenty and thirty-grain baths. A valued correspondent, signing "N," who for many years past, when strong baths were almost universally in vogue, maintained that good results might be obtained by weak baths, and sent us specimens from time to time, has recently sent us some further examples of the results of a twenty-grain bath, which in vigour and depth are equal to anything which could be produced upon a hundred-grain bath. In a letter accompanying them he says: "The question of weak nitrate baths for printing has been revived in some of the photographic journals, and the addition of certain nitrates, or a peculiar preparation of the paper, has been proposed. I send you two small prints, done on paper not specially prepared, and sensitized in a twenty-grain solution of nitrate of silver, made up long ago, for addition to the developer. Am I justified in contending that fair prints may be obtained from a weak sensitizing bath? I admit, however, that more time must be given to obtain them than with strong solutions. Your chemist readers will smile at my toning mixture. I add nitric and muriatic acids (aqua regia) to the chloride of gold, and neutralize with soda. Of course it will not keep; but if used immediately, its action is rapid, and the prints do not lose strength or colour in the hypo fixing bath." We may remark, in passing, that we shall probably have something to say shortly on the toning bath mentioned in the letter, but content ourselves by observing at present that it appears to be a very valuable bath where great toning activity is required.

In the twenty-grain bath above mentioned there is neither addition of nitrate of soda or similar salts, nor of alcohol. We do not intend now to enter into any discussion as to the advantages of nitrate of soda, beyond remarking that whilst its use was at first chiefly defended by practical photographers, and that simply on the ground of experience in its value, it has gradually been gaining the sanction of chemists, amongst whom we may mention Dr. Schnauss and Dr. Emerson Reynolds. On the use of alcohol we have one or two remarks to make. We notice that there has recently been a revival of the proposition to render the film of albumen on the paper insoluble by brushing it over with alcohol. The same proposition was discussed some years ago, and we believed that the fallacy was exploded. From a series of careful experiments we came to a conclusion some years ago that dried albumen was not coagulated or rendered insoluble by alcohol. A piece of paper soaked for a few minutes in methylated spirit of 820 sp. gr. had the albumen removed. Brushing the same spirit over the surface of the albumen had a similar effect. The use of absolute alcohol did not dissolve the albumen, but it did not render it insoluble. Applying spirit containing a little water—say of the strength of rectified spirit—to the back of the paper might possibly effect something, by first moistening the albumen, and then rendering it to some extent insoluble; but we found no advantage whatever when the alcohol was applied to the face. Even if the advantage claimed were fully established, the cost of alcohol and of time would render the operation one of very doubtful economy.

But the addition of alcohol to the bath gives an advantage which is based on altogether different grounds. It is not added for the purpose of coagulating the albumen, but merely for the purpose of supplying the place of so much water, and so rendering the solution less active in dissolving the albumen during the period of sensitizing. In this respect it is unquestionably valuable, and its use implies no waste of time in performing an additional operation.

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SILVER SOAP FOR PHOTOGRAPHIC PURPOSES.

In referring in our last to experiments with silver soap for photographic purposes, we mentioned that one of the simplest modes of obtaining this preparation was to decompose oleate of soda by nitrate of silver. The Castile soap of commerce is a mixture of oleate and margarate of soda, sufficiently pure for most purposes. For those who wish to work with a sample of oleic acid absolutely pure, the following method, given in the *American Journal of Pharmacy*, will be interesting.

"The best results are obtained as follows:—Dissolve two ounces of good white Castile soap in twenty fluid ounces of boiling water, and add about one ounce of sulphuric acid, diluted with two fluid ounces of water, and stir together; the fatty acids of the soap are separated, and rise to the surface, where they collect and float as a clear yellowish oily layer. The vessel is now removed from the fire, and, with a siphon, decant the acid solution of sulphate of soda constituting the inferior layer of liquid, carefully avoiding the loss of the oily part by stopping in time. The oily acids are then well washed three successive times in hot water, separating them as before; after which, by exposure to cold, they solidify. The mass is then weighed, put in a suitable dish, and half its weight of finely-powdered litharge added, and the mixture digested at a heat of 212° to 225°, until complete union is effected. The resulting oleo-margarate of lead, which differs from lead plaster only in containing a smaller proportion of oxide of lead, is to be agitated with at least ten or fifteen times its weight of ether in a bottle, until it is completely disintegrated. The resulting liquid is transferred to a filter, and closely covered; an ethereal solution of acid oleate of lead passes through, and a residue of acid stearate or margarate of lead is left on the filter. To the ethereal solution add aqueous muriatic acid as long as chloride of lead is precipitated: shake thoroughly, and pour off the resulting ethereal solution of oleic acid, recover the ether by distillation, and the residue in the retort will be nearly pure oleic acid.

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PURE WATER.*

BY WILLIAM CROOKES, F.R.S.

In examining the value of the various methods which are available for removing infectious or offensive materials from water, so as to render it safe for ordinary use, or for purifying it to such an extent as to render it both palatable and harmless to drink, it is as well to bear in mind the means adopted by Nature for similar purposes. To the eye of the chemist, the action of the waves breaking on the sea-shore represents one of the grandest sanitary operations of Nature. Londoners flock to the sea-side from crowded streets and vitiated atmospheres, knowing, by experience, that thereby they can probably obtain renewed health; but few think, as they sit on the shore and lazily throw pebbles into the approaching waves, that the violent mechanical agitation of the water, its forcible commingling, drop by drop, with the atmospheric oxygen, and the rythmical pulsation to and fro of each wave, are so largely concerned in the supply of that health to which a residence on the sea-shore is so conducive.

It has often been said that the sea is the best disinfectant known; and in the breaking waves we see the means by which this disinfecting action is in great measure carried out. The sea is the common cesspool for the sewage of the world, and in time it would become so offensive as to endanger health, were it not that its powers of purification are almost infinitely in advance of anything we can add to pollute it.

The energetic action of oxygen dissolved in water has before been alluded to. When water is agitated with air, each of the constituents of the latter is dissolved, but not in the same proportion. Air contains about 23 per cent. of oxygen and 77 per cent. of nitrogen; but the mixture of oxygen and nitrogen, which exists in solution in water after exposure for some time to the air, contains 33 per cent. of oxygen and 67 of nitrogen; and by boiling this aerated water, such a mixture of oxygen and nitrogen can be expelled. Now, by the action of the waves, the particles of water are violently dashed about and brought into close contact with the air; and the curling-over movement of the wave, and the way in which it sucks in a certain volume of air, just before it breaks, are peculiarly favourable to the very rapid absorption of the air by the water. When aerated, the water retreats underneath, and allows its place to be taken by a fresh volume of water, which comes rolling in over the surface of the previous wave, and in this manner the dissolved oxygen is quickly circulated throughout the mass of water, where it hunts out and oxidizes to the utmost limits all kinds of dead organic matter which it may meet in solution. The same action, though not quite to the same extent, is constantly going forward over the whole extent of the sea's surface, and the aggregate power of oxidation thus conferred upon the ocean is far more than will ever be required for the destruction of human sewage. Sometimes, indeed, for a very limited space along the shore, just at the mouth of a sewer, or in front of a fashionable watering-place, there is more foul matter poured into the sea than it can dispose of at once, but the ebb and flow of the tide soon carries the noxious material far away, where the oxygen reduces it to its simplest combinations.

Now, in the artificial purification of water, on the small scale, the plan adopted by Nature should be followed. The complete destruction of the organic matter present by means of oxygen, must be the first thing aimed at; and as the scale on which the operation would have to be conducted, if the atmospheric oxygen were the sole agent used, would be too large, and the time too prolonged for private individuals, recourse must be had to highly concentrated preparations of oxygen, which chemistry has placed at our disposal. Foremost of these must be placed the permanganates, which have been so admirably popularized by Mr. Condy, and introduced into commerce by his firm, under the name of Condy's Fluids. The best known, and perhaps the most useful for general purposes, is the permanganate of potash—a crystallized compound containing 40 per cent. of oxygen. When dissolved in water, it forms a solution having a magnificent red-purple colour, and possessing the most intense colorific properties. The aqueous solution is quite stable if protected from dust; but on exposure to the air, it speedily decomposes by the action of organic matter. If a few drops of this solution is mixed with water, rendered impure by decomposing organic matter, the beautiful pink colour rapidly goes, whilst a brown flocculent precipitate of, hydrated peroxide of manganese gradually collects together and settles to the bottom of the glass. On adding further quantities of solution of permanganate, it will be noticed that the time required to effect decolorization will become longer after each addition, until at last the water will retain a permanent pink hue. At this point it is generally supposed that the purification is complete, and that all the organic matter is decomposed and oxidized; and, in ninety-nine cases out of a hundred, there is no doubt that this is the case, and that it would be perfectly safe to drink such water, or employ it for domestic purposes.

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* Continued from p. 436.

But a case may occur in which water distinctly reddened with permanganate of potash, may contain the germs of a deadly disease; and this fact cannot be too strongly impressed upon the mind. The term organic matteris one of the most inclusive in the language of chemistry. It comprehends every compound which is not decidedly mineral in its nature, and is wide enough to embrace sugar, strychnine, port wine, carbolic acid, blotting-paper, sewage, microscopic animalcules, and cholera poison: and it is one of the greatest fallacies which ever puffed itself into popular belief to imagine that a permanganate will go blindly to work and destroy all these diverse substances with equal rapidity and ease. Like all other instruments of aggression—from Armstrong guns downward—its powers of destruction are just in inverse proportion to the amount of resistance which it meets. Some of the bodies mentioned above—such as the deadly strychnine and the health-preserving carbolic acid—are rapidly attacked and destroyed, when in solution, by permanganate of potash; but microscopic animalcules live, and apparently enjoy themselves. in water containing too much permanganate of potash to be pleasantly drinkable, and there is abundant reason to suppose that the germs of cholera poison possess an immunity almost, if not quite, as great. The fact seems to be that, whilst permanganate of potash readily yields up its available oxygen to dead and unstable organic matter, living organized beings are able successfully to resist oxidation. As Dr. Letheby has well observed, it may well be that all discoverable traces of organic matter may be removed from water, and yet it may still contain enough ot the minute germs of disease to manifest its morbific action wherever it is used. It is not the quantity of organic matter in water, so much as its quality, which determines its dangerous properties, and therefore to trust blindly to permanganate of potash alone to kill the cholera germs, because it will remove decomposing organic matter from water, is to rely upon an assumed property which physiology and chemistry have proved it does not possess. For these reasons it appears that Dr. Frankland's suggestion of purifying water, suspected to contain cholera poison, by mixing permanganate of potash with it, is worse than useless, for not only would it be inefficient, but, by the fancied security attending its adoption, it would disarm suspicion, and make people careless. To be quite effective, a modification is required; and fortunately this is not difficult either to provide or to carry into effect.

(*To be continued.*)

SOME PHOTOGRAPHIC HINTS.

BY A PRACTICAL MAN.

The ornamented French cards with oval for portrait, which are cheap and neatly executed, would be much improved if the makers would get some up with the oval aperture cut out, so that the photograph could be fastened on to the back or placed on another plain card, coloured, and then glued or pasted to the back, the proof showing below the thickness of the top card. Photographers would also find it to their interest to produce pictures on resinized paper, which can be purchased ready prepared at no greater cost than albumenized paper. The proofs are exceedingly soft and vigorous, and tint well in either water or powder colours; the manipulations of sensitizing, toning, and fixing are just the same. The only caution necessary is to watch the printing, as in a good light they print with great rapidity, and must be but slightly overprinted; the colouring and getting up for cases and trays is so simple, certain, and effective, that if once introduced they would be sure to become popular.

To make presentable designs with little or no knowledge of drawing may seem rather a doubtful assertion, but it can easily be done by anyone with a little taste and ingenuity. The designs to which I refer are for small ornamental cards, tablets, or note heads. The manner of proceeding is as follows:—Take the border of any clean wood-cut or lithograph, paste it down on a sheet of glass or stout millboard—let it represent either an oval or square; if the centre of the corners have any device not appropriate to your intended design, cut a piece of white paper to any required size or shape, and paste over the same: the centre of the design may then be filled in with lettering or ornamental clippings from any appropriate source. Two examples are forwarded to the editor as illustrations—the oval was produced by pasting down an old wood-cut from an illustrated paper, the corners, which had the imperial crown of France, were stopped out with a piece of white paper, and a monogram introduced; a mediæval ribbon or band was traced on the centre with a pen, and the lettering put in the same way; an old Indian-ink sketch was pasted at the bottom, and, when all was dry, a negative taken in the camera, and printed from. The other label was produced in the same way, some of the clippings being from the advertisement pages of the Photographic News. All who can draw may produce some very superior effects with no limit to the variety, while those who cannot draw, but can photograph, may produce a series of pleasing and presentable specimens.

LAC FOR PHOTOGRAPHIC PURPOSES.

BY A PRACTICAL MAN.

As the attention of photographers has been lately called to the use of a solution of lac in the preparation of albumen and other papers, a few words on this resinous substance will possibly be of interest, as will also a simpler method of rendering lac colourless than the one which recently appeared in the *Scientific American*, and some twenty years ago in the *Franklin Journal of Philadelphia*, as "Dr. Hare's Process."

Lac is the product of an insect found on different kinds of trees in the East Indies. These insects pierce the small branches of the trees on which they feed, and the juice that exudes is formed by them into a series of cells for their eggs.

Lac is imported into this country adhering to the branches in small transparent grains, and is called stick lac. When the grains are carefully picked from the branches, it is called seed lac; when in thin, flat scales, it is called shell lac; and when formed and melted into larger pieces, lump lac.

From its possessing in a higher degree than any other known resin the essential properties for a good spirit varnish, it has ever been a great desideratum to render it colourless, and no manner of doing so has ever been found so effective and simple as "Luning's Process," which was brought under the notice of the Society of Arts, when the sum of twenty guineas were voted to the inventor. The process is as follows:—Dissolve five ounces of shellac in a quart of rectified spirits of wine; boil for a few minutes with ten ounces of well-burnt, fresh animal charcoal, when a small quantity of the solution should be drawn off and filtered. If not colourless, add more charcoal. When all colour is removed, pass it through a piece of silk, and afterwards filter through fine blotting-paper. This varnish, if applied in a place where the temperature is not less than 60° Fah., will dry in a few minutes without chill or bloom. It is particularly applicable to drawings and photographs that have been sized. It possesses, in an eminent degree, the best qualities of a good hard spirit varnish.

An old writer on the subject says:—"In addition to its medicinal virtues, a beautiful red colour may be prepared from it by simply boiling stick lacca in water, and then filtrating the decoction, and evaporating the superfluous humidity.*

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OVER-EXPOSED NEGATIVES.

BY C. A. SEELY, M.A.†

Has any one ever seen an overtimed negative? "I have!" we imagine each and every photographer to answer, and with a very confident air. But the answer to us is unsatisfactory; we respectfully ask photographers to reconsider the case.

In the early days of collodion photography, it was customary, for portraits, to give exposure of about one minute. We have before us an excellent negative, made at Brady's ten years since, for which we sat a minute and a half; we have not seen a better negative made since, so far as modulation of light and shade and fine detail all over are concerned. The light is no more brilliant to-day, and our chemicals are no more sensitive. Many photographers, on examination of this negative, would say that it is over-exposed. And it is true that the negative shows no picture at all by reflected light, and it requires a long time for printing. But we can satisfy any one that a shorter exposure would not have secured a better positive print.

We are willing to admit, and do believe, that the negative in question was over-exposed; but what we desire to have noted is the fact, that the print has not suffered in quality thereby. There is nothing more desirable in the practice of our art than quick exposure; but we must beware that we do not sacrifice too much for it. Many suppose that there is a very wide range of time for exposure. They think that by management of the developer and redevelopment they can make the negative of five or ten seconds the same, or as good, as that of twenty or thirty. But the careful observer will find that he cannot do it.

It is our conviction that nine-tenths of the negatives made are really under-exposed. We earnestly ask photographers to look into this important matter, and find out if there be an occasion for raising this alarm. If even it turns out there be little occasion, the discussion can do no harm.

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NOTE ON THE KEEPING QUALITIES OF COLLODION.

BY M. LUDOVICO DE COURTEN.‡

Collodion is one of the most delicate and important elements of photography. The best operators will tell you that when working with a good collodion, favourable results may always be relied upon, even under the most disadvantageous circumstances. I have for some time carefully studied the different phenomena, reactions, changes, &c., which take place from time to time in collodion, in order to arrive at the truth of their production, as it is of great importance, in photography, to understand fully the cause of certain effects occurring under certain conditions.

Nothing is so variable in its character in the wet collodion process as the collodion itself. The sensitizing bath seldom gets out of order, and the nitrate of silver solutions give but little trouble, except perhaps when prepared with impure water containing organic impurities; but it is the iodized film of cellular tissue, so delicate and unstable in its character, that is generally the cause of our despair. Some time since, whilst working with a collodion prepared with my own hands, I met with some most unaccountable failures; all my plates were fogged, and spotted like marble, and this without any change having been made either in the use of materials or mode of manipulation.

My collodion was composed as follows:—

Gun-cotton	1 gramme
Ether	80 cubic centimetres
Alcohol	40 " "

I divided my collodion into two portions, one of which I iodized with a sensitizing solution, in the proportion of 100 cubic cent. of the collodion to 10 cubic cent. of the sensitizer, which was made of the undermentioned materials:—

Iodide of cadmium	1½ gramme
Bromide of cadmium	½ "
Alcohol	10 cub. cent.

The collodion thus sensitized yielded most successful results, and it worked very uniformly for two or three months. At the end of that time, being in want of a fresh supply, I iodized the second portion of my collodion, which I had kept in a bottle completely filled and hermetically sealed, and stored away in a dark place, perfectly cool. In experimenting with this second batch of collodion, I used the same baths, the same chemicals, and the negatives were produced under the same conditions as before; but the pictures I obtained were foggy, full of spots, and devoid of intensity. The results obtained were, in fact, of a most deplorable character; and, to add to my discomfiture, I found that my baths had been completely spoiled. Yet I had been using the same collodion, and sensitizing solution taken from the same bottle, which had previously worked so well. In order to discover, if possible, the reason of the change that had taken place in the collodion, I instituted the following experiment:—

I prepared 1,000 cub. cent. of collodion in the same way as before, and having obtained two bottles of equal capacity, I put 500 cub. cent. into each. The collodion contained in one of the bottles was then sensitized with the solution above described, the other remaining in its normal condition. These two bottles were well stoppered, and placed in a cool place in the dark. After keeping both samples for three months, I iodized the second sample, and then kept them for a further period of two months. Thus the specimen which had been sensitized for five months was of course more liable to undergo decomposition than the one which had been two months only in a sensitized condition. I compared these two examples, and the results obtained confirmed the opinion I had previously formed on the subject, viz., that collodion will remain in good condition for a very long period, if sensitized as soon as possible after its preparation; whereas very uncertain results are obtained if it remain unsensitized for any length of time. The collodion which had been sensitized at once yielded pictures of the finest description, whilst the other sample not only gave indifferent results, but perfectly spoiled the bath from which but a moment before I had obtained the most brilliant negatives.

It is stated by many writers on photography, in direct opposition to the results thus obtained by me, that collodion will keep for an indefinite period if not iodized; but my object in writing this paper is not to discuss the subject, but merely to record my experience; besides, it is a matter very easily proved by a simple experiment within everybody's reach. In a similar manner I have many times been advised by eminent scientific gentlemen to substitute the use of bromides and iodides in a solid state for the ordinary sensitizing solution, which is found to improve on keeping, and to answer the purpose admirably.

Why do the majority of the sensitized collodions of commerce retain their properties for a lengthened period, while those which are sold unsensitized, although manufactured in precisely the same manner, generally yield indifferent results? Good pictures are, no doubt, sometimes produced with collodion kept for a long time in its normal condition, but such cases are decidedly exceptions to the general rule.

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* Shellac dissolved in naphtha in a wide-mouthed bottle, the cork of the bottle having a small brush fixed in the same, is one of the handiest things possible for the studio, answering all the purposes of glue, and drying very quickly.

† *American Journal of Photography.*

‡ *Moniteur de la Photographie.*

I would simply call the serious attention of photographers to this comparative experiment made with products manufactured at the same time and in the same manner, but subjected to different treatment, and thereby yielding widely different results.

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COLOURS IN THEIR RELATIONS WITH ARTIFICIAL LIGHT.

BY PROFESSOR J. NICKLES.*

Colours do not appear the same by candle or gas-light as by day-light, so that we form a wrong conclusion of the hues of a flower, a picture, or a fabric when we examine it at night. The painter who, overtaken by darkness, and anxious to complete his work, lights his lamp to supply the lost day-light, is much surprised on the morrow at seeing how incompletely the tints then applied respond to his intentions.

These facts are well known, and I only refer to them because I believe I have found the means of enabling anyone to see, at all hours, various colours with the same tints as they possess in day-light, and also because I believe I have found the cause, or one of the causes, which occasion, in the light of candle, lamp, or gas, the strange perturbations I am about to describe.

Upon a former occasion, when I wished to show the existence of the perchlorides and their cojeners, I wished to make a preparation of perchloride of manganese, which, with ether, gives a compound of a beautiful green colour. It was evening, and instead of the beautiful green colour I had promised, I obtained a black liquid. Sure, nevertheless, of my fact, but unable at the moment to account for the disturbance, I waited until the morrow, when all was explained. The change of colour followed the change in lighting. Green in day-light, the etherized perchloride of manganese appears black by the flame of coal-gas, by one of those phenomena of absorption to which I shall further allude.

What put me so quickly upon the road to this explanation was the recollection of a fact of the same sort which had struck me some years previously at one of my evening lectures. The subject was potable water; and the various agents by which bicarbonate of lime was recognized were passed in review. Among the number was a beautiful crimson red pigment derived from the privet (*Ligustrum vulg.*), which pigment never fails to give a blue colouration in any liquid containing bicarbonate of lime. Sure of this fact, I announced that the blue colouration would take place; and to enable the audience to see the effect, I placed the glass between them and the gas-light. Imagine my disappointment: the colour was red, and no degree of concentration would make it appear blue, as it had done some hours previously. The reason is now very plain; the colour depends on the nature of the lighting, and the colouring developed appeared blue or red according as it was viewed by day-light or gas-light.

From this moment I made a series of experiments on this matter which belong to our subject. I recognized that bicarbonate of potassa, the nitrates of zinc and of lime, turn the blue of the privet red, like the bicarbonate of lime had done, but the light of the lamp did not affect this blue colour in the same manner; for by placing the tube between the eye and the flame, I remarked that the colouring was *red* when the liquid contained chloride of zinc or bicarbonate of lime, and that, on the contrary, it was *green* with the nitrates of lime or the chloride of calcium; and that, moreover, the blue colour does not change when it has been produced by bicarbonate of potassa. Now these changes of colour, which appear by the light of a lamp, are not produced by the light of *magnesium*: the blue remains more brilliant, perhaps, than by the light of day, in the same manner as the fine crimson red of pure *liguline* remains; but the green of the etherized perchloride or perbromide of manganese also reappears in all its splendour when lighted by the magnesium flame, even if the candle or gas continues burning.

These facts established, we may anticipate how the light from magnesium will act with regard to other colours. The experiments I have made on this subject permit me to say that this light brings out the various colours, both natural and artificial, in the same hues as they appear by day-light, even when the medium is lighted by organic combustibles. I do not pretend to say that there is an absolute identity between solar and magnesium lighting; by applying to the colours lighted by the latter the delicate process of analysis with which M. Chevreul has endowed science, we shall probably find a difference in the tones, for the light of magnesium is much whiter than that of the sun, and brings out the primary colours marvellously; but what it is easy to satisfy ourselves upon is, that in this light the various hues preserve their respective positions; the tones are not confused, as they are in the artificial light of a candle, gas, or other illuminating agents.

The services which chemistry renders to painting will not henceforth be limited to the production of colours more or less rich, for as we have seen, it has endowed it with a new mode of lighting that consists of a kind of metallic lamp, which, when lighted, will permit of the painter working at night without incurring mistakes or illusions.

And when I mention painting, I include all the arts that employ colours. Take dyed stuffs, coloured woods, stained paper, and wafers, and observe them in both lights; then open the shutters of the dark room, in order to judge of the effect produced by day-light, and you will doubtless soon come to the conclusion that, in the matter of colours, neither candle nor gas can supply the place of the sun so well as the light of magnesium.

It will be interesting to trace the cause of the extinction of colour with which the present system of lighting is reproached.

The effects of extinction may be referred to several causes, due to the fact that the flame is yellow because it contains *sodium*, as we learn from spectral analysis, another curious metal, which in burning yields a *yellow* flame, as strontium gives a *red* flame, thallium a *green*, and indium a *blue*. Now when the yellow flame of sodium illuminates a *blue*, it produces green. If it strikes a colour which is complementary to *yellow*, it will produce *white*, if the body is capable of reflecting colour; and *black*, on the contrary, if the body does not reflect; which is equivalent to saying that this flame alters the nature of colours, deepening the hues of some and extinguishing others. Doubtless this explanation will not be found complete, and, in this respect, theory has still much to do; but if the facts be exact, this is unimportant. Of this I now proceed to give satisfactory evidence.

The better to understand the part which, in my opinion, sodium plays in flames for light-giving, let us place ourselves in extreme conditions, by operating with a flame which we have taken care to saturate with this metal. It is quite easy to obtain such a flame. Take a spirit-lamp, and put into it a piece of common salt (chloride of sodium); this body, soluble in alcohol, rises with it into the wick, and consequently into the flame, to which it communicates the properties in which we are now interested. Take a sheet of paper covered with *manganate of baryta*, a very beautiful green, which appears still more beautiful in day-light or in the magnesium light. Take another sheet of paper coloured with *biniodide of mercury*, a magnificent yellow, which gains much in sunshine. And take another sheet coloured with chrome yellow, a very beautiful colour—a little pale, perhaps, but which the sun or magnesium will do justice to. None of these colours are as bright by night as by day, still they appear very beautiful by gas-light. Viewed by the salt-lamp, we see that the *green* becomes *black*; the *red* is confounded with the *yellow*; and both become *white*.

The antipodes of magnesium—sodium—is then the enemy of colours when it is found in homogeneous flames; it extinguishes them, or reduces them, in general, to white, black, or grey, which is a mixture of both. Now, what can do the large, can do the small. If the flame of sodium in excess can extinguish colours to the point of reducing them to black and white, a flame less rich in this metal will produce only a partial extinction; this is why colours are generally visible in the light from candle or lamp, although they do not fail to receive reflections or touches of which we now have the secret.

But where does a gas flame derive this sodium? It comes from the coal from which it was manufactured, and which always yields much ash; it comes from the water with which the gas was washed—water which, coming from wells in connection with marls, takes up a quantity of the salt with which these soils are impregnated; it comes from matter employed in its purification, and probably even from the atmospheric air, in which traces of it are always found. The air also supplies sodium to the candle and oil-lamp, and there is also a store of it among the mineral substances contained in the wick.

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* An Experimental Lecture delivered before the *Académie Stanislas* at Nancy.

Sodium, then, undoubtedly plays a part in the flames which compose our domestic light, and doubtless in all flames sufficiently illuminating, but devoid of this or any other colouring metal, or which, containing sodium, is at the same time supplied with an incandescent nucleus, like the sun or the electric light. I have no doubt that such a flame will not be likely to act upon colours as the magnesium light does.

It is probably because it contains sodium that the solar light is yellower than the magnesium light; and it is, perhaps, on this account that the latter brings colours out better than sunlight. If we desire to give to the magnesium light the exact tint of the solar light, we have only to add a little sodium to the former, so as not to burn pure magnesium, but an alloy of magnesium and sodium.

Special researches have shown me that a large number of *green* matters appear black in the soda flame, and the same result takes place with many substances of *red* colour. With the exception of the blue of the privet, blues are not annulled by the flame of the soda-lamp. At most, they only change in tone. The green of leaves is variously affected by this flame; some appear yellower, others are blackened. It seems that under this relation they behave like other greens. The *mixed green*, composed of chrome yellow and Prussian blue, appears grey, with a greenish yellow hue, very disagreeable to the sight. Take a series of substances coloured red—nitro-prussiate of soda, iodide of antimony and arsenic, and ochre—all appear *black* by the light of sodium. Tartrate of iron and potassa, of a brilliant *brown* in day-light, when a plate is viewed as a transparency, acquires a very *black* hue in the soda flame.

According to the Newtonian theory, *black* signifies the absorption of all colours, while *white* is supposed to be the production of the reflexion of all. But red colours give white or black at pleasure, according as they are employed in a greater or lesser state of concentration; for example, the red matter obtained by treating a salt of the sesquioxide of iron with sulphocyanide of potassium; it greatly resembles venous blood, and the name of artificial blood has been given to it. By candle or lamp-light it is of an intense black; diluted with water, it is still colourless, but with a grey tone, however; while it is manifestly red when viewed by lamp-light, and still more so by day-light or the magnesium light. The red crystals of which we have spoken dissolve in an appropriate vehicle, and their solution appears colourless. Similar phenomena occur with bromine, iodine, and doubtless, also, amorphous phosphorous, which, like them, appears black in the flame of sodium. But bromo-iodized water and an aqueous solution of iodine appear colourless in this flame.

The splendid crystals of *bromo-bimusthate of ammonium* in the violet rays of the spectrum assume a very beautiful claret colour. Now, if the flame of sodium is made to intervene, the red colour, as well as the violet ray which has served to develop it, is extinguished, and the crystal appears colourless. In their normal state, these crystals are of a beautiful yellow colour; the soda flame makes them appear colourless, which is the more surprising after witnessing the effects of extinction exercised by this flame upon the vivid yellow given by chromate of lead.

In the several blue flames produced by cupreous salts the blue subsists, notwithstanding the soda light; it is with difficulty that the eye can perceive any change. By this light, ultramarine and Prussian blue appear black, retaining, however, a violet reflection. Aniline blue, dissolved in alcohol and spread upon white paper, in the soda flame exchanges its beautiful blue for a dull violet; but when, instead of dissolving it, it is viewed as a thick coating, or in the mass, it appears black. The crystals of chloride of cobalt are of rose colour, which by the light of the soda flame appear white-grey. Heated in a glass receiver, a magnificent blue is developed, which braves unchanged the soda flame, so injurious to other colours.

In fact, the only hues which resist even slightly the yellow flame are furnished by the blue. All other hues are profoundly modified by this flame, which causes them to appear of a black, more or less clear, or of a white, more or less grey.

It is in these results that we must seek the explanation of a fact which is often made the subject of popular experiment,—the cadaverous appearance which the soda flame gives to the countenances of the audience. The countenance appears of a livid *green*; the lips a *blue violet*. These tints are evidently due to the *blue*, which alone can resist the effects of extinction caused by the soda flame. Besides, this livid green is familiar to all who have played with "snapdragons," or plum pudding garnished with burning brandy; for in these cases salted alcohol is in operation. This sinister tint is also sometimes produced in workshops, and especially where blast furnaces are at work, and at forges where wood is burnt. Here it is evidently the soda in the cast, the scoride, and especially the ashes, which in volatilizing, and perhaps in reducing, occasion this effect of colouration. Fortunately, the effect ceases with the cause that produces it; fortunately, too, the flames which serve as sources of light are not saturated with sodium, else we should be at night exposed to the inconvenience of seeing everything *blue*.

Although not saturated with sodium, still they are sufficiently yellow to form *green* with certain *blues*. Doubtless this is why certain blue fabrics appear green at night, and also why, in a well lighted room, it may happen that a green dress is with difficulty distinguished from a blue one; for the green may be somewhat blackened, while the blue will form green with the yellow light diffused.

These experiments not only explain certain effects of colouring, but have a more immediate practical utility. For example, paint on a screen with pigments ground in gum-water a spectrum consisting of large bands of red, orange, yellow, green, and blue. The blue will appear a little blackened by gas-light, but by the magnesium we see the colours of the spectrum of irreproachable purity. But by the light of the soda flame the rich colours disappear, and in their place we see only white and black. The following is the composition of this spectrum, and the colours with which it was painted:—

Colour by daylight.	Colouring material.	Colour when seen by the soda flame.
Red	Ochre	Black.
Orange	Deuto-iodide of mercury	White.
Yellow	Chromate of lead	
Green	Manganate of baryta	Black.
Blue	Aniline blue	

To this spectrum, so strangely disfigured, sunlight and the magnesium light instantly restore the normal colours, even while the soda flame is burning in proximity. Things do not look so well in diffused light, for then the soda flame does not fail to manifest its presence by visibly paling the colours.

When the soda flame operates in a darkened room, the various colours of our spectrum image are, so to speak, extinguished so completely that we see nothing but white and black. It is to be remarked, however, that the edge of each colour is marked by a tone of colour more or less deep, or more or less graduated, as if we had taken a photograph of the spectrum. The model remains, thanks to the half tones, so that in looking at a painting in the most varied colours by the soda-flame, we see nothing but the *forms* or design. In pictures in which green predominates, however, this flame may allow a yellow tint to subsist, the origin of which has already been explained. This will be the case with Schweinfurth green, or a mixed green. So also blue is not always destroyed by this flame; it may, however, be made to appear black.

In conclusion, I hope it may be found that these researches are not altogether useless to the arts. As the soda-flame abolishes the colours of a picture only, while it allows the model to remain, it is evident that by its aid we can readily arrive at the design with touching the picture—make, as it were, the autopsy of a *chef-d'œuvre*, and thus give to works of art a chiaroscura which sunlight cannot render so well.

The monochromatic flame of sodium has this in common with the brilliant light of magnesium, that it will serve—though in opposite direction—to group colours and to measure tones. Two colours—two *greens*, for instance—may appear to be exactly identical on the palette by daylight, but it does not follow that they will at night, when lighted by the domestic lamp. Here is a case in which we may employ the soda-flame, which, by exaggerating the effects of absorption or extinction occasioned by the flame of candle or gas, enables us to judge promptly of the value of a hue in view of a given effect.

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EXPERIMENTS WITH THE ANILINE PRINTING PROCESS.

BY DR. H. VOGEL.*

You know already, that the sensitizer in this process is a solution of bichromate of potash mixed with phosphoric acid. Paper floated on this solution, and dried, is of a yellow tint, which becomes afterwards a light green. The sensitized and unexposed paper assumes in vapours of aniline a blue-violet tint, more or less intense.

Therefore, if you expose the paper under a positive print (a drawing, lithograph, &c.), you obtain a white pale drawing on a yellowish-green ground, which becomes quite visible on the blue-violet tint after fumigation with aniline. For trying this printing process, we endeavoured at first to ascertain the influence of the quantity of phosphoric acid and bichromate in the sensitizing solution, and we have found that the intensity of the tint, which the picture assumes in the fumigation with aniline, increases with the quantity of chromate of potash, and much more with the quantity of phosphoric acid. On the ground of this principle we increased the quantity of phosphoric acid, more and more, in our experiments, and stopped at last at the following proportions:—

Bichromate of potash	1 part
Water	10 „
Dissolved phosphoric acid, specific gravity, 1·124	10 „

In this solution we let the paper float one minute. By allowing it to float longer, the solution penetrates, and the back of the paper also becomes coloured. In order to hinder this penetration, it is good to dry the paper quickly, best in a warm room. The paper itself plays an important part. With Rive paper we got no satisfactory results. It became easily stained, and appeared much less sensitive than Steinbach's. The latter (Saxe paper) gives excellent results.

As already remarked, the printing takes place under a positive. The parts lying under the transparent spots of the positive become light green, the others remain yellow, and one gets thus a yellow drawing on a green ground. By lamplight this is less visible, and is better in daylight. This pale yellow picture takes a bluish tint in the vapour of aniline. If the paper is under-exposed, the ground also becomes coloured; if it is too long exposed, it becomes coloured very slowly. Hence one can see of what importance the time of exposure is.

In the case of positives with semitones, one must often examine them, until even the details in the dark part begin to be visible in a yellow colour. In copying drawings, after a short time the whole picture is visible; but after bringing it in the vapour-room, the green ground, which should remain light, becomes blue. Thus, it is necessary to expose until the ground is perfectly reduced in the light (*i.e.*, till it has lost its liability to become blue in the aniline vapours). The time of exposure must be regulated according to the thickness and transparency of the paper. For drawing on Whatman's paper we required, in clear weather, half an hour; for thick paper, one hour or more; and for very thin paper, some minutes. If one prints too long, the image sinks into the paper, and is often visible before and behind.

But there is a means to fix, with considerable certainty, the time of exposure by any light, and with any paper positive, where this is not yet known from experience. If the picture becomes visible in a yellow colour, cut off a small piece from the edge of the yellow paper (that is, where it lies under the drawing to be copied), and bring it into the vapour-room. If it colours here within ten minutes, the drawing is still not sufficiently exposed. Repeat the test after some time. If the proof-piece no longer colours, the drawing is sufficiently exposed, and can be fumigated in aniline.

A person experienced in this printing process will seldom require to employ this test. As a matter of course, the intensity of the ink or colour in which the drawing is made is a matter of great consideration. If this is grey and transparent—as, for instance, in pencil drawing—it is difficult to receive a deep colour. Transparent collodion positives copy best. The time of exposure for these is from one minute to one hour, according to the light and the thickness of the positive. In the development, these are kept as dark as possible in the shadows, and clear in the light parts. The aniline process can here be of importance for enlarging. An enlarged positive is made from the original negative, and this is printed off according to the new process.

In drawing, the thickness of the paper is also of importance. If this is thin in the copying, lay the face uppermost, and a positive is got directly in the proper position but if the paper is thick, the copying would lack sharpness if such a process were followed. In this case the face must be placed upon the sensitive paper. Then a sharp copy is produced, but inverted. In drawing, this gives little trouble, although here the figures and letters are also inverted. (Here the prints which are copied through—*i.e.*, where the picture is visible also at the back—are of advantage, because at the back it appears in the proper position). A method, tried some week ago, of making drawings transparent with benzole, did not yield us, in later experiments, such good results.

In the case of collodion positives, the inversion of the picture can be easily avoided, if they are taken from the very beginning in the proper position. (The positive must then have the same position as the original negative, if both are seen from the same side). Drawings on dissimilar paper become, of course, easily dissimilar. The steaming is performed in a flat dish. The pictures are laid on the bottom of it, and a cover of wood is put over it, on which blotting-paper is mounted, and this latter is moistened with a solution of—

Benzole	1 ounce
Aniline	30 to 40 drops.

The richer in aniline, so much the more quickly does the solution work. This must be poured on as equally as possible, otherwise individual parts remain behind in the development.

The picture appears after some minutes, if it is not over-exposed, and increases continually in intensity. Its colour is impure black-blue-green, but becomes a beautiful blue when put into water. If very long fumed, the tone of the picture becomes more brownish-black, and more suitable for portraits. If for a short time, the tone is more blue. The duration of the development depends entirely on the proper time of exposure. Drawings which were somewhat too short a time exposed should not be too long fumed, because otherwise the ground would become coloured; over-exposed ones, on the other hand, do not give a picture till after a long development. A slight over-exposure, and a somewhat longer development, would recommend themselves for portraits, if one wishes a more brownish-black tone. Sometimes the picture appears green in the washing water. This does not matter. One can quite easily convert the green colour into blue, by putting ammonia into the washing water. The tone of colour becomes green through acids; through ammonia (or alkalies in general). blue. The bathing in acid has the advantage of being able to dissolve the protosulphate of chromium, which otherwise remains in the picture and colours it. So far we succeeded in getting the ground clearer, if the copy is put after the first washing into 100 times diluted sulphuric acid, then washed, and lastly coloured again blue by being floated in 100 times diluted solution of ammonia. In the solution given above, rich in phosphoric acid, such an acidifying of the copies is not necessary. They become clear enough without it, if they are only properly exposed. Sometimes the pictures appear stained in the soaking, although they were perfectly pure before. These stains, however, disappear again in the drying. Let these be washed in water changed eight times, and let some ammonia be added to the fourth water, if the tone should appear greenish. Concerning the durability, we have positive experiences lying before us, inasmuch as Willis's prints, which we have in our hands, have lasted excellently for a year. Some of our prints which we made in January have become green. This arises from the imperfect washing, whereby a trace of phosphoric acid remained behind. But these prints are easily made blue again.

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* *Philadelphia Photographer.*

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PRECIPITATION OF METALS FROM THEIR SALINE SOLUTIONS BY MEANS OF MAGNESIUM.

M. Roussin has just published a paper on the action of magnesium on metallic solutions, and on its application to toxicological researches, which shows that magnesium is particularly well adapted for the precipitation of other metals from solutions of their salts. It is a general principle that one metal will precipitate from a saline solution any other which is less readily oxidable than itself; but some metals, by no means among the most oxidable known, had nevertheless, when M. Roussin began his researches on this subject, resisted all attempts to precipitate them by the contact of another metal with their saline solutions. With two exceptions, however, all the metals alluded to are precipitated in the metallic state by magnesium, the two exceptions being chromium and manganese, which appear to be precipitated as oxides. Among the metals which M. Roussin has precipitated in the metallic state, by means of magnesium, from slightly-acidulated solutions of their salts, are gold, silver, platinum, bismuth, tin, mercury, copper, lead, cadmium, thallium, iron, zinc, cobalt, and nickel. The precipitated metals, when washed from the saline liquid and then dried and compressed, possess a very remarkable degree of brilliancy. Iron, cobalt, and nickel, so precipitated, are highly magnetic; zinc takes the form of a large spongy mass, which the least compression renders brilliant. Magnesium does not precipitate aluminum at all, and chromium and mangenese, as already mentioned, it precipitates as oxides. It does not precipitate arsenic or antimony, though it decomposes their salts, the arsenic or antimony flying off in combination with hydrogen. M. Roussin shows that great advantages result from the substitution of magnesium for the metals ordinarily employed in toxicological researches for the detection of these and other metallic poisons; but into that part of his subject it would be beyond our province to follow him. His only further statement respecting magnesium calling for mention here is one relating to its use as a voltaic element. "The foregoing qualities," he says, "encouraged the hope that a substitution of magnesium for zinc in ordinary piles would offer a great electro-motive force, and experiment confirmed this theoretical inference. A small plate of magnesium, 0·1 grain in weight, placed beside a plate of copper in a small tube of glass of six centimeters cube, filled with acidulated copper, produced in less than ten minutes an electro-magnetic appearance, and illuminated a Geisler's tube ten centimeters long. If magnesium should ever become cheap, this would decidedly be the best way of producing electricity."

In a note to his paper, M. Roussin states that he has observed that a sodium amalgam, shaken up with an acidulous solution of a salt of chromium or of a salt of manganese, changes to an amalgam of chromium or of manganese, as the case may be, and that an amalgam of either of these metals, obtained in the manner indicated, when distilled in a current of hydrogen, after having been first carefully washed in acidulated water, leaves the pure metal in the form of a pulverulent sponge. The amalgam of manganese, he adds, is opalescent and crystalline; that of chromium more fluid, and less variable at ordinary temperatures. When the latter is heated in a small porcelain capsule in the air, as the mercury flies off in vapour it carries off mechanically with it particles of chromium, which take fire, producing a singular scintillation, which is best observed in a darkened room. At length the chromium remaining in the capsule suddenly becomes incandescent, and burns to oxide.—*Mechanics' Magazine.*

CHLORIDES IN COLLODION.—A DEVELOPER WITHOUT ACETIC ACID.

BY P. C. DUCHOCHOIS.*

I send you the formula for collodion without bromide I spoke to you about a few days ago; you may publish it if you choose, as I do not make any secret of the little I know, nor do I take a *patent* for the use of it. Of course I do not pretend to have discovered the photographic property of chlorides, and I know well that its application in the collodion process belongs to Mr. Bingham, and also to you, Mr. Editor. Here is that great process sold by somebody as a secret discovery, superseding everything, and which, I believe, supersedes nothing at all, not even the bromide:—

Collodion.

Ether conc. sp. g. 0·72	15 fluid ounces
Alcohol at 95·	14 „ „
Brom. of ammonium 1 equivalent	144 grains
Chloride of cadmium ½ equivalent	45¾ „
Pyroxyline *quant. suff.* about ...	170 „

Silver Bath.

45 grains to the ounce.

Developer.

Water...	20 fluid ounces
Sulphate of iron	1 ounce
Bi-sulphate of potash ...	1 „
Alcohol *quant. suff.* about ...	½ fluid ounce.

Fix with hypo.

The Editor of the *American Journal of Photography* adds:—"The allusion to us is on account of experiments we made ten years since, in the use of chlorized collodion for printing purposes. We had no thought of using a chloride in negative collodion.

Mr. Duchochois omits to mention, what we believe to be the fact, that he is the inventor of the developer described. We have tried it, and found it to work perfectly, and are informed that Mr. D., as well as many others, have used no other for a long time. The bi-sulphate of potash is cheap, and, being solid, is easily transported and preserved. Good bye, Acetic Acid!

Mr. Duchochois does not think that the chlorides are complete substitutes for the bromides. They work slower, and in some other respects they are different.

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PINHOLES IN NEGATIVES.

BY PROF. TOWLER.†

From a recent announcement made by Dr. Vogel, it appears that pinholes in negatives may by caused by sulphate of silver present either in the collodion or in the bath. If the sulphate is in the collodion, it may be attributed to the imperfect washing of the pyroxyline; and if in the bath, to some impurity in the nitrate of silver, or a soluble sulphate in the water. The bath will seldom be the cause of this trouble as far as regards sulphate of silver; but allowing it to exist, the doctor knew how to apply an immediate remedy by means of nitrate of baryta. By the application of this remedy he hit upon a very curious discovery. It was this: the bath, to which nitrate of baryta had been added, produced great intensity in the shades of the negative.

But the principal causes of pinholes is not sulphate of silver; this trouble arises from two principal causes, the over-iodizing of the collodion, and insoluble particles in the bath, arising either from supersaturation with iodine, or from dust. To meet the first cause we recommend a diminution of the quantity of bromo-iodides in the collodion, not exceeding five grains to the ounce of mixed fluids; and dust and other particles are removed from the bath by frequent filtration and strengthening of the solution by the addition of fresh nitrate of silver every two or three days.

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* *American Journal of Photography.*

† *Humphrey's Journal.*

It is also advisable to filter the collodion frequently; indeed, photographers would do well to filter the collodion and bath every evening, to be in perfect working order the following day; in fact, we would keep six filters in row, each one labelled as follows, and each in operation every evening:—

No. 1 for the collodion; No. 2 for the silver solution for negatives; No. 3 for the silver solution for paper; No. 4 for the developer; No. 5 for the toning solution; No. 6 for the fixing solution.

It is a real pleasure to work with solutions so clean and transparent; and the results will pay you for the trouble. Do not believe that you injure any of these solutions by filtration; whoever tells you so is no chemist, and cannot support his assertion by facts; and experience will soon teach you the benefit of the plan recommended.

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PRINTING PROCESS BY DEVELOPMENT FOR THE SOLAR CAMERA.

BY A. CHEVALIER.*

Paper sensitized with iodide of silver, and still moist, appears to me to be the most appropriate for enlargement by the solar camera; the process is easy in its manipulations, and the paper requires a very short exposure.

Beat up to a snowy froth the whites of thirty eggs in six ounces and one-half of water, and put it aside for a day to settle; then pour off the clear portion through a piece of muslin into a flat dish, and draw a piece of blotting-paper over the surface, in order to remove dust and other impurities. Each sheet of paper is allowed to remain six minutes on this bath; it is then hung up to dry. When dry, the sheets of paper are placed between sheets of blotting-paper, and submitted to a moderate pressure. By this proceeding they are more easy to handle afterwards.

Formula for the Iodizing Solution.

The white of egg...	10 ounces
Iodide of potassium	170 grains
Bromide of potassium	48 „

The mixture is beaten up to snow, and, after settling, the clear portion is decanted in a porcelain dish. The previously prepared paper, albumenized side downwards, is placed upon this solution and left there for a minute and a half. By this double mode of preparation impressions are obtained completely on the surface of the paper.

The silver bath is prepared as follows:—

Distilled water (32 ounces) ...	1 quart
Nitrate of silver	2¼ ounces
Glacial acetic acid...	3¼ „

The paper must be laid upon this bath without any stoppage, otherwise streaks will appear during the development; it is allowed to remain upon it for three minutes. In the meanwhile a sheet of moist blotting-paper is made to adhere to a piece of plate glass of the proper size by means of its moisture, and upon this another similar sheet is placed, taking care in either instance to avoid bubbles. After the sensitized sheet has drained for a short time, it is laid smoothly upon the moist blotting-paper, to which it adheres firmly; in this condition it is exposed.

As soon as the outlines of this figure are visible, the paper is taken into the dark room and developed. Make the following solutions:—

Gallic acid...	1 ounce
Alcohol	5 ounces.

This is filtered, and labelled "Stock Solution," from which the following is prepared:—

Of the alcoholic solution of pyrogallic acid	5 drachms
Distilled water	1 quart.

The prepared sheet is first laid, picture side upwards, on this bath, then turned round and immersed in the solution, moving it about all the while. By means of a tuft of cotton all adhering impurities on the wrong side are brushed off, in order that no irregular deposit may be deposited in those places. The sheet is now turned round, and you watch the picture as it begins to appear. It is a very interesting spectacle to behold a large picture start out with so much uniformity.

If the time of exposure was right, the picture will be fully developed in ten minutes; the lights remain of a pure white, and the shades preserve their transparency.

If the time of exposure was too long, the detail in the shades will vanish, and the lights assume a grey tinge; and when the exposure has been too short, the shades do not become sufficiently intense, and the more delicate details do not appear at all.

The picture side must also be brushed over with the cotton tuft, in order to protect from irregular deposits. Whilst the picture is developing, a second sheet is placed on the silver solution.

The same bath of gallic acid may be used for three or four pictures, which must be kept in continual motion during development. Nevertheless, the bath must be no longer used, excepting as long as it remains quite clear; if it becomes turbid, it is thrown away. The pictures are placed in water; and whatever impurity may be visible on their surface is rubbed off with the cotton tuft. A new bath is then prepared as follows:—

Distilled water	8 ounces
Nitrate of silver	1 drachm
Glacial acetic	4 drachms.

As soon as the pictures have become sufficiently intense, they are washed in several waters, and then allowed to remain in water until you are ready to proceed to the fixing.

The fixing solution consists of three parts of hyposulphite of soda and ten parts of water. In this solution the pictures are placed one after another, taking care to avoid bubbles; they are frequently turned round to thus facilitate the perfect solution of the iodide of silver. In half an hour they are brought out into the light and examined, to see if they are quite clear in the lights. This being the case, they are immersed in a vessel full of water, which is frequently changed, in order to remove every trace of hyposulphite.

The tone at this stage is in general of a disagreeable brownish-yellow hue; they are, therefore, toned in the following bath:—

Chloride of gold	15 grains
Distilled water (32 ounces) ...	1 quart
Chloride of calcium (fresh) ...	15 grains.

The chloride of calcium is first pulverized in a mortar containing a little water, and then mixed with the other ingredients. The bath has to be filtered just before use.

The bath is very energetic, especially if it be newly made. The pictures, therefore, must not be neglected, but be kept in constant motion, in order that the toning may be uniform. The lights remain clear, and the shades assume a beautiful brown-black tone. The prints hereupon are thoroughly washed.

If, however, the lights have not been preserved quite clear, the picture is placed in a solution of half a drachm of chloride of calcium in eight ounces of water, and washed over with the cotton tuft. Finally, it is again thoroughly washed.—*Humphrey's Journal.*

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THE ERGOT DEVELOPER.

BY E. A. KUSEL.*

I have been experimenting for some time to find a developer which would combine all the good qualities of all the known developers, and which could be made cheap and quick, and without going to so much trouble as we have in making a good collo-developer. This I think I have partially accomplished, so far as my experimenting goes; and as to trying it, it don't cost much. I tried it, and am satisfied that it works. The following is my first experiment.

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* *Photographisches Archiv.*

* *Humphrey's Journal.*

Protosulphate of iron	2 ounces
Water	20 „
Alcohol	2 drachms
Extract of ergot	20 drops.

This I tried, and found it developed quick and intense, but the film was full of specks and comets. Here the question arose: What is the reason, and how to get rid of this trouble? The developer looked clear. This also I found: nitrate of silver precipitates ergot, but leaves, as I believe, acid of ergot, or ergotic acid, or some other substance in the developer; I therefore dropped in the developer some fifteen to twenty drops of nitrate of silver solution from my bath; this made the developer turgid, and precipitated the ergot. I filtered clear, and tried again, and the picture marked No. 1 is the result. Without intensifying the negative of my second experiment, the developer stands thus:

Iron	2 ounces
Water	20 „
Extract of ergot	20 drops
Alcohol	2 drachms
Silver solution	15 drops.

Dissolve the iron in the water; filter; add the ergot and alcohol, then the silver; shake well, and filter again. After ten days' standing I find the developer again turgid; and not wishing to send you this letter without trying again, I filtered again, and found it worked better; more even and clearer; an intense picture, No. 2. Both pictures were taken with an exposure of fifteen seconds, with a 4-4 old-style Harrison's tube, with a stop of two inch opening. You may judge of the pictures. They are not what I call excellent, but the gradation and softness of the shadows is all, I think, we could wish for.

Be so kind as to try it; and, if you should find it useful, I wish you would give it to the fraternity in your valuable journal.

[According to the analysis of Dr. Wright, ergot consists of the following ingredients:—

Oil	31.0
Fungin	11.4
Altered starch	26.0
Mucilage	9.0
Gluten	7.0
Vegetable osmazome	5.5
Colouring matter	3.5
Salts and free phosphoric acid ...	3.1
	96.5

From a cursory view of this analysis—which, however, is not quite satisfactory—we should at once decide that, if ergot really has any good properties as a developer, these must be derived from the starch, mucilage, and gluten, which act as restrainers, or like an acid. When added to nitrate of silver, a copious precipitate is produced, which is insoluble; and when nitrate of silver is added to protosulphate of iron, an insoluble precipitate is produced. These facts we know already; but we cannot discuss the merits of your developer before we have tried it, which we shall do shortly, and may then be in a condition to say more about it. Judging from the cards sent, the developer acts well.—Ed. H. J.]

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PHOTOGRAPHIC SOCIETY OF MARSEILLES.

The Woodbury Process—M. Meynier's Collodion Sensitizer—Mr. Taylor's Shellac-printing Process.

At the August meeting of the Society, under the presidency of Mr. Arthur Taylor, some discussion arose with reference to the photo-relievo printing process of Mr. Woodbury, specimens of which had been forwarded to the Society by Mr. Wharton Simpson. The picture was much admired, and considered to be the finest specimen of mechanically printed photographs yet exhibited, greatly surpassing those produced by the processes of MM. Poitevin, Swan, and others.

M. Vidal acknowledged the beauty of the specimens, but declined to speak as to the future success of the invention; although he was convinced that the process of Mr. Woodbury, in which the modulations in the tone of the picture were obtained by a layer of ink varying in thickness, was the best method hitherto made known, still he was of opinion that some important alterations and improvements might be made in it. Some of the members had expressed a fear that the process was an elaborate and difficult one, and that only negatives of a superior character would give favourable results. With regard to the first point, there was no doubt that it was well founded; but as this was merely a mechanical difficulty, there was every reason to believe that the process would soon be simplified. The objection that thoroughly good photographs are required for working the process, is one that exists in all other processes. Of course good prints can only be obtained from good negatives, and any process will be successful by which we are able to transfer a good photograph into a good engraving.

The President said that if the Woodbury process was as simple and easy of manipulation as its inventor stated it to be, no special knowledge or skill in operating would be required, as was the case in ordinary engraving; but supposing that a few days or even weeks of careful, delicate work, performed by a skilled operator, were necessary to produce a Woodbury plate, such toil would bear no comparison to the amount of labour and time expended in executing a fine engraving by an artist who has required many years of careful study to qualify himself for his work. It is well known that many of the best engravings have occupied artists during twelve years of incessant labour. It is scarcely reasonable to expect the production of a good picture from an indifferent photograph. As in all other branches of art and industry, the finest results can only be obtained by an artist whose qualifications are of the highest order; but as disciples of photography have become so numerous, and good instruments and good processes are now so common, there is little fear of the application of photography to the printing-press being restricted to a few skilled artists.

M. Morlet said he should be glad to see all applications of photography within the reach of every amateur photographer.

M. Vidal was of opinion that this was impossible. If it were worth while to convert a photograph into an engraving, a large number of prints would necessarily be required, and these could not be struck off except by workmen specially used to such work. It is the same with engraving and lithography. Any artist may trace a design upon the stone, but an experienced workman with special knowledge and appliances is required before even a proof print can be obtained from the same. First-class lithographic or copper-plate printers are very rare, but this fact does not in any way hinder the employment of these useful branches of art and industry. Thus it is with photography; it would be impossible to carry out a printing process except under special circumstances.

M. Jacquemet presented the report of the commission nominated to examine into the merits of the double cadmium and sodium salt proposed by M. Meynier for sensitizing collodion.

Comparative experiments made with this salt, and with mixtures of bromine and iodine salts, showed the former to be of much practical value, on account of its great and rapid solubility. Being made up in recognized proportions ready for use, it is very convenient to those who desire to simplify as much as possible the different photographic operations. The commission, while acknowledging the quality of the proofs obtained with the sensitizer, were of opinion that the same effects might be produced with other proportions than those specified, or with another combination of substances; at the same time the collodion sensitizer of M. Meynier deserves a place among the several efficient photographic preparations with which we are at present acquainted, and may be deemed a fresh proof of that gentleman's constant efforts to improve the different photographic processes.

Mr. Arthur Taylor announced the completion of his work on the shellac printing process.* The second portion of Mr. Taylor's communication contains the different proportions of materials recommended to be used in carrying out the process, and it has therefore been anxiously awaited by those interested in his invention.

The meeting of the Society was then adjourned till November next.

Correspondence.

WETTING DRY PLATES PRIOR TO EXPOSURE, ETC.

Dear Sir,—It lately occurred to me that, as the reason why wet plates are so much quicker than dry ones is simply because the pores of the film are more open, and allow the light to act more effectually, why should it not be practicable to wet a dry plate and expose it while wet, allowing it to dry, and leaving the development for a future operation?

I have tried simply washed plates without any preservative, and also some prepared with tannin, allowed them to dry, floated them with water immediately before exposure, returned them to the plate-box, and developed next day, the result in each case being perfectly satisfactory. I obtained in this way the quickness of wet plates, without the trouble and annoyance of a tent, bath, or developer.

I have a yellow bag, tube-shaped, which I had made in the days of calotype, for the purpose of changing my prepared papers. This, with a single dark slide, a box of plates, and a shallow gutta-percha dish or a jug of water, is all that is requisite for a day's work. You have merely to place the dish or jug, plate-box, and slide on the ground; put the bag over your head, and squat down; dip or float the plate, and place it in the dark slide. After exposure, return the plate to the box, and repeat the operation.

I am aware that the plan of wetting dry plates is no novelty, but I do not imagine they have ever been allowed to dry between exposure and development, which I consider to be the great advantage. Groups, cattle, shipping, and other *movables* can thus be taken without the bother of a waggon-load of "impedimenta." I hope some of your readers will try the process, and report the result.

Allow me to warn your readers against the plan of M. Obernetter, for obstructing the actinic rays, published in the *Bulletin Belge*: it is a delusion and a snare. I allude to the acid solution of sulph. of quinine mixed with gum arabic, with which paper is washed.—I am, dear Sir, yours very truly, Baynham Jones.

Cheltenham, 18*th September*, 1866.

MR. CLAUDET'S DISCOVERY.

Sir,—I observe in one of the journals some statements made to the effect that Mr. Claudet's method of altering the focus of the lens during exposure was not new. In your article on the subject you intimated that something of the kind had been done before. I wish to know what, in your opinion, constitutes discovery in such cases. I have, in my bungling experiments as an amateur, more than once attempted to improve the effect by altering the focus during exposure. Am I, too, one of the discoverers of this valuable expedient? A friend tells me that the plan is so far old that one of the French opticians has for some time made an objective, the back lens of which is moved with a rack and pinion. Is this so?—Yours, J. M. T.

[The whole value of discovery consists in publication. We have no doubt that many persons have tried a similar plan to that of Mr. Claudet; but none of them have had the courage to avow their adoption of such an expedient to secure an improved pictorial result, or the generosity to publish, for the benefit of their brethren, a hint which was calculated to improve in one particular the quality of their work. In all cases of claim to prior discovery, the legitimate appeal is to published records. If no such records exist, the claim falls to the ground. We believe there is such a lens as your friend mentions, but made for a different purpose to that proposed by Mr. Claudet.—Ed.]

THE EFFECTS OF CYANIDE, PEROXIDE OF HYDROGEN, ETC.

Sir,—Will you allow me to say to one or two of your correspondents, that I lost the use of a finger, and attributed the loss to cyanide of potassium, which I employed freely about two years ago. Having given up the use of cyanide, the power of the finger is returning.

To another, who tried mercury, &c., in an attempt to make peroxide of hydrogen, that perhaps if he cleans zinc plates with acid sulph., and leaves them in a saturated solution of bichloride of mercury for a time, he may get on better.

Respecting the right quantity of table salt to add to washing water to precipitate silver, it struck me, that if, after stirring up, an ounce were put into a glass, and a strong solution of salt added drop by drop, the right quantity could easily be observed for that ounce, and then it would be a rule-of-three sum, and useful for any quantity or density.

Excuse great haste, please. Yours faithfully,

September 19, 1866. A Physician.

Talk in the Studio.

Journalistic Vacation.—Our contemporary the *American Journal of Photography* has just made a re-appearance after a vacation of four months. The editor explains that change of location and other pressing business changes induced him to suspend publication, intending at first that the recess should be for one month only, feeling "that such a liberty might be taken with the public after a faithful and uninterrupted service of fifteen years." We are glad to see our contemporary resume active existence, and hope its new tenure may continue twice fifteen years.

Cabinet Portraits.—We are glad to ascertain, from correspondence and personal observation, that the cabinet portrait style is likely to receive general adoption. Dr. Liesegang informs us that German photographers have at once adopted the proportions proposed in this country, and that the new style promises to become a favourite with the public. The price charged in Germany is ten thalers (£1 10s.) per dozen.

Another Case of Piracy.—A few days ago, at Marlborough Street, Mr. Lewis applied for a summons against a person just detected in offering pirated copies of valuable pictures for sale. It was immediately issued, and a man named John Lawrence was brought into court. Francis Ingram, clerk to Mr. Gambart, publisher, Pall-mall, saw the defendant that day in Oxford Street, offering for sale a quantity of copies of registered prints, one of them being the "Light of the World," of which Mr. Gambart was the owner. The defendant asked 1s. 6d. for it, but a genuine copy would cost two guineas, an artist's proof eight guineas. The defendant refused to give the name of his employer, and would not state from whom he bought the prints. In the defendant's box were a good many other spurious copies of well-known registered prints and pictures. The defendant said he did not know that he was doing anything wrong. He bought the copies in the regular way. Mr. Tyrwhitt said by this statement the defendant made himself the proprietor of the pirated copies, and not the mere seller employed by another person. Had he said he was only the seller at so much per day the case would not have been pressed against him; but as he asserted he was the owner by purchase, he must be fined £10 each for the eight copies in his possession. Mr. L. Lewis said if the defendant chose to say who sold the copies to him, he should ask the Court to let the case stand over. The copies purport to be executed by German copyists.

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* See Photographic News, p. 374.

APPLICATION OF PHOTOGRAPHY.—Mr. F. K. Hudson, of Ventnor, Isle of Wight, states that he has photographed a letter, which was picked up in a bottle, announcing the sinking state of the ship *Spanish Queen*, in order to send fac-simile copies to the friends of G. J. Mills, the writer, the original having been forwarded to the Board of Trade.

ON THE SPLITTING OF FILMS.—"N." says: "A correspondent of yours some months ago gave excellent reasons against the acceptance of suggestions made by me for the preservation of films. No doubt I "blew hot and cold," recommending either, first, a very rapid drying of the plate by artificial heat; or, secondly, very slow drying, by placing the freshly-washed plate in a closed place, where no current of air could affect it, and in nearly a horizontal position—at least, much inclined. However wrong I may be in the theory, I still, from further experience, believe myself to be right in fact. Let those who are troubled with splitting films try the remedy suggested, and judge between scientific theory and unlearned practice. Perhaps it may be useful to some of my amateur brethren to state how I apply the heat. I select a moderately heated part of my kitchen hot-hearth, and rest my plate (still moist, but not wet) upon it, supporting it, say, on two stems of lucifer matches, so that the heat to every part of the plate may be equal, and nowhere excessive. I have before stated that I believe unequal, uneven drying to be one great cause of the splitting of the film."

WATER-COLOURING.—We have recently had an opportunity of examining the work of Mr. J. P. Bligh, of Plymouth, in finishing photographs in water-colours, in which he secures a degree of excellence in flesh-painting we have not often met. As to whether his work is high or low-priced, we are uncertain; we believe the latter. Its excellence will surely command for it good demand.

ROYAL CORNWALL POLYTECHNIC INSTITUTION.—The Annual Exhibition opened on the 14th instant. We hope in our next to publish a list of the awards in the photographic department.

PHOTOGRAPHY AND FLATTERY.—A *Buffalo* paper says:—"If it be difficult for man to know himself, it is no doubt equally so with t'other sex. With the ladies, in the matter of photography or portrait-painting, this is peculiarly the case; they are seldom satisfied. If it be that Miss Jenkins has her portrait taken, and is dissatisfied, her friend Miss Jones will say it is an excellent likeness, and *vice versâ*. But a 'cute down-easter at the Falls has hit upon a plan which invariably gives satisfaction to the sitter, although as invariably his photographs are denounced by the friends of the party. The artist professes to give a coloured portrait of a lady in ten minutes. As there are many excursionists who wish to have their portraits, as well as scenes of the Falls, which he keeps in stock, the idea struck Jonathan that he could produce the one as quickly as the other; so he keeps in stock an immense quantity, of all sizes, and all taken from the same block—an effigy of what Helen of Troy is supposed to have been—the very acme of female beauty as regards face, bust, etc., but with every shade of hair, from coal to carrots. Long may he prosper!"

"FUN" ON PHOTOGRAPHIC PIRACY.—I am glad to see Messrs. Graves and Son are so active in hunting down piratical photographers. It is a pity they don't extend their operations, and punish a few of the patrons of such scamps. If "gentlemen" have not sufficient honour and honesty to refrain from purchasing stolen goods, their dormant senses should be roused by touching their self-regard. As for people who talk about the "art-education" which is cheaply furnished to the poorer classes in this way, they are hardly worth talking to. What would they say to a man who stole their watch in order to encourage a taste for mechanics by exhibiting its works to his friends at so much a head? I should recommend Messrs. Graves to have an eye on our Government Offices, which I believe are infested by vendors of unauthorized photographs, who thus not only rob the printseller, but the public—by wasting the time of the industrious clerks.—*Fun*.

To Correspondents.

CYANIDE.—Considerable discussion arose some years ago on the effect of pine boxes on dry plates. No very definite conclusion was arrived at, some maintaining that they had always used pine boxes without any evil result, others affirming that fogging, &c., was, in their experience, to be traced directly to the use of pine boxes. The difference of opinion was probably due to the different kinds of dry plates. We think that with dry plates in which any trace of free nitrate, or of an organic salt of silver, was present, it is probable that the vapour of turpentine exhaled by the pine might be detrimental. The best dry-plate boxes are those of metal, with gutta-percha grooves. It is also desirable to paste a strip of paper round the junction of the box and lid, so as to make the boxes nearly air-tight, when the plates are to be kept in the box more than a few days. 2. Condy's fluid purifies water by oxidizing any organic matter present, but it does not remove chlorides, carbonates, &c., and therefore would not make common water take the place of distilled water.

DEVOUE.—You may with propriety add carbonate of ammonia or of soda to your hypo bath if it be acid. The harm done by an acid fixing bath is to sulphurize the print and hasten its fading.

?.—As a general rule, the best position for a stop is about one-fifth of the focal length in front of an ordinary single landscape lens. Placing the stop at a greater distance will reduce the field of illumination, but it will flatten the field and improve the definition. 2. There are so many causes for want of intensity that we cannot point out the cause in your case without knowing more particulars. Send us one of your pictures, and state particulars of collodion, bath, and developer; also kind of lighting and amount of exposure. We shall then probably be able to help you by indicating the cause of your difficulty. 3. We have not tried it, but should think that it is not necessary. 4. We presume it is: that is a suitable article for making soluble paper.

BAOMO.—There are several methods of printing on ivory. We have seen very good results produced by coating the ivory with albumen containing a chloride, exciting on a silver bath, exposing, toning, and fixing in the usual manner; but before toning, the albumen is rubbed off the ivory, leaving an image underneath it. You will find details of this process, and of a method by an iron process, in our YEAR-BOOK for 1865. The best results we have obtained ourselves have been by uranium printing, after the Wothlytype method. The collodion containing the uranium and silver salts is poured upon the ivory, and, after finishing, the collodion is removed by means of ether, a fine image remaining on the ivory. You will find particulars on p. 49 of our Ninth Volume.

ARLUNUDD.—Try using your bath of half the strength, or certainly not exceeding 60 grains. It is probably due to the use of the bath too strong, which has a tendency to cause rapid discolouration.

ACID.—The arborescent markings on your negative appear to be due to crystallization, probably arising from keeping the plate until the nitrate solution on its surface began to dry. 2. The "Richmond" portraits are not patented. There was a brief description of them, as produced by Mr. Petty, a month or two ago. 3. Portrait lenses may be used for landscape purposes, but they should be stopped down considerably. There is more danger of a central spot of light with portrait lenses than with single lenses. 4. You do not state what stereoscopic lenses you mean when you ask, are they more rapid than portrait lenses? For street views, small double combinations are most suitable.

H. MARTIN.—The fault is probably owing to the position of the mirror, which only reflects a portion of the sun's disc. By moving it a little, so as to secure a perfect image of the sun, you will get rid of the partially illuminated image.

M. T.—There are several plans of photographing upon boxwood, for the use of the engraver. The method described on p. 49 of our Ninth Volume answers well. A good method is described on p. 193 of our Second Volume. To avoid having a reversed image, the negative should be taken through the glass, or else have the film transferred, which is easily effected by the method described in our last Volume.

B. N.—It is possible to produce photographic fac-similes of bank notes which are very difficult to distinguish from the originals. As to the mode of detecting the fraud, much would depend on the mode of printing adopted. If ordinary silver printing, it would be easy to distinguish it from the effect of printing ink. A variety of tests might be used; but one of the readiest would be the application of a little cyanide, which would quickly dissolve a silver image, but would not injure printing ink.

A FRIEND.—Thanks for your kind letter and suggestion. We aim to do full justice to the department you so kindly appreciate, because we know its importance, and we hope to continue to do so.

F. M. Y.—We cannot form a fair estimate of the defining powers of the pair of lenses, from the print enclosed, for two or three reasons. The subject is not a very suitable one for test purposes; and the negative is not sufficiently perfect to indicate the quality of the lenses. So far as we can judge, the definition is not very perfect. 2. The negative is scarcely of average excellence for a dry plate. It appears to have been under-exposed and over-intensified. The process is one with a considerable tendency to hardness, unless very skilfully managed. 3. As we have said, we cannot fairly judge of the defining powers of the lenses; but, so far as we can judge, the English lenses you name are infinitely superior. 4. A vignette head on a quarter-plate may be produced by the lens you name, with its central lens removed. 5. The card by the resin process is flat, from very dull lighting. Such a subject imperatively demands sunlight. It is probable that with the same plate you would have obtained a much better picture if the subject had been properly lighted.

W. BRUNTON.—Thanks for the print and promised account of your studio. The lighting of Mr. Bligh's head is very fine; but the exposure appears long.

B. L.—The enamel surface of which you speak is produced by gelatine and collodion. A clean plate of glass, coated with a tough, plain collodion. When that is dry, it is coated with a solution of gelatine. When that is dry, a wet print is placed face down on the gelatine, excluding air-bubbles. When the whole is dry, lift a corner with a penknife, and the print, with the surface of gelatine and collodion, will leave the glass perfectly.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 421.—*September* 28, 1866.

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SINGULAR CRACKING OF TANNIN NEGATIVES.

A committee of gentlemen, consisting of practical and scientific photographers, was recently called upon to report upon the causes of a disastrous and singular splitting of the film in a large series of negatives, which, from the fact that they could not readily be replaced, were of great importance. The negatives had been produced in India, and belonged to the Bombay Government. They had been placed in the hands of a large and respectable photographic firm in this country to print, and whilst in their possession a large number of the films had cracked in a peculiar and unusual manner—in many instances to such an extent as to render them totally useless.

On examining the negatives, this committee found the cracks to be of a character altogether different from the kind with which photographers are occasionally familiar, and the causes of which are pretty well understood.

We may digress a moment here to refer to two kinds of cracks to which collodion negatives are, under certain circumstances, subject. The first generally assumes a honeycombed form, the film being raised in ridges, which form the borders of each cell in the honeycomb-like structure. These ridges eventually break or burst with a ragged edge, and the negative is often ruined. The primary cause of this form of cracking, there is very little doubt, arises from traces of the fixing salt—either hyposulphite of soda or cyanide of potassium—left in the film from imperfect washing after fixation, or from the presence of chlorides or other soluble salts in the water used for final washing. These salts remaining in the collodion, or between it and the glass, communicate to the film a hygroscopic character, which causes it readily to absorb moisture if brought into contact with a damp atmosphere, which issues in the swelling of the film into these honeycombed ridges, and the final cracking of the film. This disaster will come about in some cases without any lack of care in the keeping of the negatives. We found, a few months ago, one of a series of negatives in our care, which had been produced by a most careful manipulator, with this honeycombed film. It stood in the middle of a pile of half-a-dozen on a shelf; none of the others, kept under the same conditions, and produced by the same gentleman, having suffered any change. Nevertheless, the mode of storage will sometimes induce this kind of cracking: damp and frost will, undoubtedly, hasten it. We remember a case coming under our attention in which a large number of negatives, which had been kept for years without injury, became, on removing them into a new studio, with scarcely an exception, disastrously cracked. There is, however, for this form of cracking a remedy by which the damage can be considerably repaired. The method to which we refer was first proposed in our pages by Mr. R. Nichol, and has since been carefully worked out and verified by Mr. Spiller. It consists in submitting the injured film to the vapour of alcohol, which removes the blistered ridges, and re-unites the fractured edges of the varnish. The details will be found on p. 576 of our Eighth Volume.

Another form of splitting, less common, and the cause of which is less perfectly understood, consists of a series of vermicular cracks, sometimes over a portion of the plate, and sometimes running over the whole film. In these cases there is no blistering or appearance of ridges. There is a distinct separation of the film, and also of the varnish, in such places: a clean, fine, transparent line, generally running in semi-circles, a series of which are sometimes joined together in an irregular manner, forming a sharp angle at their junction. An excessively contractile condition of film is evidently the cause. This contractile condition is, probably, due to the varnish rather than the collodion film, and may be produced by using a varnish formed of a gum-resin of the character of copal, which swells up something like glue when in solution, and contracts very much under extreme dessication, causing cracks. Painters are familiar with this cracking tendency in copal varnish when applied to a raw painting. Many old paintings are completely reticulated with cracks from the use of varnishes of this kind. Mr. Claudet, a few years ago, pointed out a most efficient remedy for this kind of cracking. It consisted in rubbing over the film with very finely powdered charcoal. This filled up the fine fissures in the film, which were generally most plentiful in the dense portions, and so permitted prints to be produced which showed no trace of use of a cracked negative.

The cracks in the negatives upon which the committee in question were called upon to report, were unlike either of these known types, resembling the latter chiefly in their vermicular form, although some few were more of a honeycomb character; but there were no ridges or blisters. In all cases there was a clean unjagged line of separation in the film. The most remarkable feature of the case was, that the varnish remained perfectly intact—unbroken in any way—whilst the film beneath it was split in a hundred curved and irregular lines, chiefly in the dense portions. There was no trace of the action of damp, nor did the cracks in any way suggest it. It appeared that of one hundred and ten negatives, thirty-five were cracked, twenty being hopelessly ruined, and fifteen considerably injured. The cracking was also gradually extending.

The facts of their history given in evidence were very brief. The negatives had been taken in India, and brought to this country to print, large numbers being required. They had been in the hands of one printer, whose facilities did not allow him to produce them quickly enough, and they had been therefore transferred to the hands of the firm in which they now are. When received from the hands of the first printer, some of them were slightly cracked, and since then a disastrous progress has been made. The most important item in the evidence was the fact that the series produced by the same photographer consisted of wet collodion negatives and tannin negatives, and not a single wet-plate negative had cracked, *all those with the split films having been produced on tannin plates.*

On examining the negatives, they were found to be red and intense, of a character common to those produced by the tannin process. Those which were most intense were most cracked. There were no details of the precise mode of manipulation in preparing the plates, but from an examination of the backs of the negatives it seemed probable that some preliminary coating had been applied. There was, manifestly, a foggy deposit between the collodion film and the glass, the image being in most cases veiled at the back, but not on the surface. From the great density, the fog, and the non-actinic colour, it appeared that these negatives required a very considerable amount of exposure in printing, some of them having to be left out two days in a good light to secure a good print. It necessarily followed that in sun-printing they became excessively hot, a condition which doubtless tended to the cracking which ensued.

The tenor of the report of the committee called upon to investigate the matter was to the effect, that the cracking was not due to damp, or the traces of hygroscopic salts left in the film, or to any lack of care in storing or printing; that it was not due, so far as an opinion could be formed, to inferior material or careless manipulation, nor to any special circumstance connected with the production of the negatives in India. It appeared to be due to the action of the tannin used in preparing the dry plates, which had probably combined with some such substance as gelatine—apparently present as a preliminary coating—and formed a contractile, rigid film in immediate contact with the collodion film. The action of extreme heat in prolonged sun-printing on this non-elastic and very frangible film had produced the cracking.

This is the first case of split films which has come under our notice which appears to have been due to such a cause, but here it is not in an isolated negative, but in a large number of cases. It is probable that tannin negatives have not before been to any great extent seriously tested by being employed commercially, or for printing very large numbers. The serious consequences in the case in question will render photographers cautious in incurring a similar risk.

NEW PROCESS OF PHOTOGRAPHIC ENGRAVING.

SOME interest has been excited in photographic circles in France by the announcement of the discovery of a new photographic engraving process, giving very perfect results. M. Mc. A. Gaudin, speaking of it, says:—"During the last month I have been trying very hard to obtain some information respecting the printing process said to have been invented by M. Tessier du Mothay, but as yet have only been successful in procuring a proof produced by his method which, examined through a magnifier, appears to me identical to those furnished by the Woodbury process. It is, therefore, I believe, merely an indication of the adoption, in France, of Mr. Woodbury's ingenious invention, which, although so well suited to such cases where a great number of prints are required, does not in any way militate against the employment of the ordinary photographic process if a few copies only are desired. The proof which I have examined had a perfectly continuous and even tone, similar to that possessed by a photographic print, having not the slightest appearance of grain, and thus proving that the process had nothing in common with lithography, where the shadows are produced by a greater or less concentration of fine black spots of opaque ink; but that the darker portions of the pictures were due to a film of coloured transparent ink varying in thickness, as is the case in the Woodbury process. Unfortunately, owing to the smallness of the specimen in my possession, I was unable to discover whether the ink used was of a greasy character, or a composition of gelatine.

"There is no doubt that printing with greasy ink, after the manner of aqua-tinting, as described by M. Lerebours and myself some thirty years ago, might be adaptable to this method, more especially as it is not a patented invention."

PHOTOGRAPHY IN NATURAL COLOURS.

THE *Moniteur de la Photographie* gives an extract from the *Répertoire Encyclopédique de Photographie*, which, although somewhat extraordinary in its nature, it thinks worthy of publication, on account of its connection with such an interesting, and at the same time obscure, subject. The communication is from a correspondent at Rio Grande, in South America, and the editor of the *Répertoire* states, that although he will not be responsible for the same, the character of his correspondent is such as not to leave the shadow of a doubt as to the truth of his statement. It is as follows:—

"In my capacity of correspondent to the *Répertoire*, I take the liberty of communicating a most astounding result, obtained by me, which I have no doubt you may be able to explain, and possibly take advantage of, being myself, as you are well aware, not a professional photographer, but merely an amateur who has not practised the art for any lengthened period.

Some time since, I took a positive portrait of my wife on glass. The weather was very fine, but on coming out of my dark room, I observed that the light appeared very yellow and somewhat obscured, and I then remembered that there was a total eclipse on that day. After developing and fixing my positive, I found all the colours of my wife's dress faithfully pourtrayed on the film. The dress was of blue flowers on a black ground, the cap trimmed with blue and yellow ribbons, and all these colours were accurately reproduced, and even the flesh tint of the face and hands was perfect. Unfortunately, all these colours disappeared after a lapse of ten minutes.

Whether it is possible to obtain similar photographs by means of artificial yellow light, I must leave to the consideration of more able photographers; but this result once obtained, there remains but to discover a method of fixing them."

PHOTOLITHOGRAPHY IN GERMANY.

THE *Photographische Correspondenz* for September contains a very fine specimen of photolithography, produced by MM. Reiffenstein and Rösch, of Vienna. No description is given of the method by which the photograph is transferred to stone, and the publishers, in a short notice, confine themselves to giving the expense of preparing the picture ready for printing, and the rate at which they can supply copies of the same; and they also give directions for producing negatives of a character suited for the purpose.

The instructions state that the negative must be taken on the reverse side of the plate (on the surface furthest from the lens), and therefore, allowance must be made for the thickness of the glass when focussing; it should be on very even glass, and carefully varnished, so as to lay perfectly flat on the stone. If produced by the wet process, great care must be taken not to allow any of the nitrate of silver solution to remain on the surface of the plate nearest the lens, as each drop produces a spot on the iodide of silver film. The negatives should never be quite opaque, nor should there be too much transparent glass about them.

The price charged for putting a 12 by 10 photograph on stone is 30s., and £12 is the cost of printing a thousand copies.

PURE WATER.*

BY WILLIAM CROOKES, F.R.S.

If it be required simply to purify water from ordinary organic matter (and in most cases this will be all that will be required for photographic work), reliance may be safely placed upon the oxidizing powers of a permanganate; but if the presence of an organized poison is suspected, then permanganate will fail.

Assuming for the present that the purifying action of permanganate of potash is sufficient, its powers are best utilized in the following manner:—

Procure permanganate of potash in well-defined needle-shaped crystals, and dissolve them in fifty times their weight of distilled water. Care should be taken to get the crystallized permanganate, as there is a kind sometimes sold which has the appearance of a dirty grey powder, and is very impure. The aqueous solution will be of an intense reddish-purple colour, and must be preserved for use in a well-stoppered bottle. It is applied as directed in the last number, and the precaution should be taken of adding a sufficient quantity in excess to cause the water to retain a very faint pink colour for several hours. No more should be added than will suffice to communicate a decided colour to the water when a stratum several inches thick is looked through, and no precautions need be taken to remove these last traces, as they will do no harm.

By the action of the organic matter, oxygen is removed from the permanganic acid, the hydrogen is converted into water, the carbon is oxidized to carbonic acid, whilst the small quantity of nitrogen which may be present becomes nitric acid. The permanganic acid is reduced to the state of sesquioxide of manganese, a brown powder, which, being insoluble, sinks to the bottom; whilst the potash, losing its permanganic acid, is liberated in the caustic state, when it instantly unites with the carbonic acid resulting from the oxidation of the organic matter, and becomes carbonate of potash. The water, which will now be of a faint pink colour, and will have the precipitated sesquioxide of manganese suspended in it, must be passed through a piece of fine Swedish filtering paper; this removes at the same time the suspended precipitate, and supplies from its own body a sufficient amount of innocuous organic matter to decompose the remaining portion of the permanganate of potash. The filtered water will now be free from organic matter; but, owing to the presence in it of carbonate of potash, it will possess an amount of alkalinity which will render it unfit for photographic work, or for employment in domestic uses. This, however, being very slight, may be neutralized by the exact addition of dilute sulphuric, nitric, or acetic acid.

This production of an alkaline solution, by the addition of permanganate of potash to water containing organic matter, is generally overlooked; but it may, in some cases, be of importance.

It would be very advantageous if a solution of permanganic acid were introduced into commerce for the exact purification of potable water. By the employment of this, no extraneous matter whatever would be introduced, as the permanganic acid would simply split up into oxygen and insoluble oxide of manganese. Permanganic acid is not difficult to prepare, and, being volatile, it may at once be got absolutely pure. A good plan for preparing small quantities is to dilute oil of vitriol with one atom of water, and then to dissolve in it crystallized permanganate of potash. This solution, which is of a greenish-yellow colour, is distilled, over the water bath, at 60° or 70° C. The apparatus then becomes filled with violet vapours, which condense to a soluble greenish-black liquid, consisting of pure permanganic acid. According to Terreil, it is difficult to prepare a large quantity of the acid at once in this manner, inasmuch as, where the quantity of the distillate has reached a certain bulk, the acid decomposes spontaneously with slight detonation and separation of sesquioxide of manganese. This difficulty may be got over, either by collecting the distilled permanganic acid in water, or by changing the receiver before the bulk of distilled acid becomes considerable. Permanganic acid thus obtained is a thick, greenish-black, metallic, shining liquid, which appears capable of solidifying. It greedily attracts moisture; its solution has a violet colour, and, if protected from dust, may, when dilute, be preserved with tolerable facility. It possesses very great oxidizing powers, instantly setting fire to paper and alcohol.

Owing to the intense oxidizing powers of this acid, which appear to be much greater than those possessed by the potash salt, it is probable that it would be an effectual purifier even for water containing organized poison. The removal of this kind of matter from water now constitutes the great sanitary problem of the day. Numerous experiments, which the writer has lately instituted, during an examination of the choleraic contaminations of water, have led him to adopt the following method as perfectly trustworthy.

There appear good grounds for believing that ebullition, unless continued for a very long time, will not destroy the vitality of the organized germs of contagion; but it has been amply shown that carbolic acid destroys them almost instantly. To purify suspected water, therefore, add a sufficient quantity of an aqueous solution of crystallized carbolic acid to communicate a decided taste and odour to the water; then heat to the boiling-point, or, if this is impractible, let the water remain at rest for twenty-four hours. By this time the water will cease to contain any injurious matter, and nothing remains, after filtration, but to remove the flavour of carbolic acid, which would preclude its employment for domestic purposes. This is easily done by the addition of a little dilute permanganic acid, or permanganate of potash. Carbolic acid, though perhaps the most powerful disinfectant known, possesses no immunity against the all-destroying powers of nascent oxygen, and in the presence of permanganic acid acts like any other soluble organic matter, and becomes resolved into the ultimate products, carbonic acid and water.

This plan of purification is so effectual that, by its agency, highly offensive solutions of organic matter (such as decomposing albumen, &c.), containing animalcules of the most lively description, have been rendered perfectly inodorous, limpid, and tasteless. Its adoption would offer no particular difficulties on the large scale, as boiling need not be resorted to; it therefore offers some advantages over the plan already suggested, that of adding permanganate of potash, and boiling; by this plan the action of hot permanganate of potash is relied upon to destroy the organized matter, whilst by the plan above described, the somewhat doubtful agency of heat is replaced by the perfectly effectual powers of carbolic acid.

In the ordinary purification of water it is sometimes preferable to use permanganate of lime instead of the potash salt. The reaction on organic matter is exactly the same, but the carbonic acid, uniting with the lime set free, forms carbonate of lime, which, being insoluble, can be filtered off along with the sesquioxide of manganese.

Photographers already use a somewhat similar plan of removing organic matter from solutions. When a nitrate bath, or other solution of nitrate of silver, becomes inconveniently charged with organic matter, it is a common practice to pour it into a flat dish, and *sun* it. Under the influence of the solar rays, the oxide of silver rapidly gives up its oxygen to the hydrogen and carbon of the organic matter, with precipitation of metallic silver.

CARBON PRINTING.

No. I.—Preliminary Experiments.

BY NELSON K. CHERRILL.

I have been asked to make a short abstract of my experiments on carbon printing for the benefit of those readers of the News who may intend to try the new method of making proofs from their negatives.

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* Continued from p. 447.

My experience with Mr. Swan's tissue has been up to this time but limited, though I have made several experiments with other tissue of my own manufacture, which, though not so certain in its preparation, nor quite so good in its results (as far, at least, as my experience goes), has the advantage of being very easily prepared, and for those who may at any time desire to produce a tone differing from the regular scale, which will be published by Mr. Swan, it may prove of great service. My method is as follows:—

Put into a 16-ounce bottle a quarter of a pound of gelatine with enough water just to cover it; in an hour or so fill up the bottle with water, and dissolve by gentle heat; add about half an ounce of saturated solution of sugar, pour into a measure about 12 or 16 drachms of this fluid, and then mix with it the required quantity of pigment: from 2 to 4 inches in length of the pigment, from the ordinary sized tubes of moist water-colours, will be required. Of course any mixture may be made. The exact quantity of pigment which must be used will depend upon the intensity or relative density of the negative. The measure, with the pigmented gelatine, is placed in a saucepan of boiling water, and well mixed with a stirring-rod. A glass plate, about 10 by 8 inches, is coated on one side with a very thin film of ox-gall dissolved in water. The manner in which I have found it best to do this, is to dip the clean glass into water, and then to place on its still wet surface a small fragment of the gall; this is well rubbed over the surface by the fingers, and the plate is then placed on a level stand, with the prepared side uppermost. The pigmented gelatine is now on it in the centre; a very slight tilting of the plate will ensure its flowing up to the edges. A fine brush of camel hair, or the point of a penknife, may be used to get rid of all air-bubbles. When this is done, the plate may be left to "set;" meanwhile, a sheet of printing, or "continuous," or other suitable paper, must be made just so damp as not to be able to absorb any more moisture; this is best effected by dipping several sheets into water, and then placing them in a little pile, with some blotting-paper above and below, and a gentle pressure applied to give an equal distribution to the moisture.

When the gelatine surface is well "set," a sheet of the moist paper is to be lowered upon it, and after a sufficient time has been suffered to elapse, the paper and gelatine may be lifted off the glass together. It is well, in effecting this, to pass a knife round the edges of the paper, in the first instance, and then, having just raised one corner, to tear the tissue off the glass at one continuous and somewhat rapid sweep.

The object of damping the paper is twofold. First, it enables it to obtain a much better hold upon the gelatine; and secondly, it prevents its making an unequal absorption of the moisture of the gelatine, which would cause it to curl and cockle, thereby drawing the tissue into various ridges.

When required for use within a short time, it is well to excite the tissue before drying, as by this means much time is saved. As soon as it is off the glass, there is no danger in plunging it into the solution of bichromate. Half a minute is, in my opinion, plenty of time in the saturated solution. The drying should take place as rapidly as possible. I may here suggest what I have often found, and what has often been suggested to me, upon an examination of various results in carbon which I have come under my notice, that in the finished picture there will be a certain, though a very small quantity of the oxide of chromium present; this, being of a somewhat disagreeable green colour, will affect the—what may be termed—natural colour of the tissue; and so, in the selection of tints, it is necessary to allow somewhat for this greenness.

I have found that the india-rubber solution *must* be perfectly dry, upon both the print and upon the paper on which it is mounted, otherwise an effect will be produced by the action of the water which will be ruinous to all good effect. I dry my tissue—or rather, the india-rubber solution on the tissue—before the fire; this, while effecting the rapid evaporation of the solvent, leaves the rubber in that warm, tacky condition which at once secures its adhesion to the mounting paper.

I have, in my few experiments, found that it is only necessary to press the tissue and the mounting paper together by hand, though the use of the rolling machine has been advised for the purpose.

Three minutes seems to me to be the normal exposure with ordinary good negatives, and when the point of determining the duration of the action of light necessary to produce the best result from each negative is *not* delegated to "hands" inexperienced in photographic matters, I think the time may be judged with great nicety without the use of the actinometer; this instrument, is of course, useful where either very large numbers are required, or where the person in charge of the exposure of the frame has no idea of the comparative illumination of various qualities of light, and of the obstructing power of the various kinds of negative.

SOME REMARKS ON FOGGING.

BY M. CAREY LEA.*

To any one accustomed to watch the action of developers, fogging subdivides itself into appearances, differing very much in character, so much so as at once to suggest that they arise from very different causes. And not only is there wide variation in the appearances upon the plate, but also in the accompanying phenomena, especially in the behaviour of the developer itself.

We may sometimes see the plate fog, whilst the developer remains perfectly clear and transparent; sometimes the developer will turn so thick and muddy as to seem as if it might lead to any amount of fogging, and yet the plate will remain obstinately clean. Generally speaking, the presence of much acid makes a slow development, and tends to give immunity from fogging, but this is not always the case.

The fogging of an iron developer is also very different from that of a pyrogallic. A pyrogallic developer scarcely ever fogs unless much mismanaged, but when it does, casts a brown veil over everything. It never or rarely fogs in spots, whereas an iron developer, when it fogs, is very apt to do so—not, however, to the exclusion, under favourable circumstances, of a general fogging like that of pyrogallic acid.

But there is even in this case a broad distinction to be drawn. Fogging with pyro generally arises, when it does come, from an attempt to bring up by a long re-development an image which has come up very thin under an iron development, in consequence of excessive under-exposure. This necessity for so much redevelopment can scarcely happen, except in the hands of one but little versed in photography, and such cases of under-exposure are not properly treated by a long pyrogallic development, which renders them hard and chalky, and besides, they are extremely apt to split in drying. The best treatment and the least in such cases of serious under-exposure is to wash off the picture and begin over again. When this is not practicable, the image should be subjected to such intensifying as tends to bring up its respective parts proportionately (Schlippe's salt is the best means that I know); the deposit from a pyrogallic development always falls chiefly on the densest portions.

It follows, therefore, that pyrogallic acid, when used in those cases to which it is properly adapted, viz., to the moderate bringing up of a well-managed iron picture, scarcely ever fogs—one may say, in practised hands, never. Its use should never extend to a point at which fogging is possible.

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* *Philadelphia Photographer.*

With iron, the case is very different; the causes of fogging are very numerous, and may occur occasionally with the best manipulators. I will rapidly enumerate some of the more familiar forms, and then pass to the consideration of one particular description which has much puzzled photographers.

First. The image shows itself for a moment, and then a uniform grey veil spreads over the picture, more or less thick. Here the developer and the bath are not adapted to each other; the bath wants more acid.

Second. The picture comes out well, but curious streaky stains invade the sky in a landscape, or the top of any other subject. Cause, insufficient draining of the plate, insufficient time in the bath, or too horny a collodion.

Third. Streaks like flashes of lightning, sometimes with a dozen zigzags to an inch, establish themselves here and there, reaching in from some edge, several inches into the plate. These I have had come from applying blotting-paper on the back too wide, so that it reached an edge, and set up a capillary action with the film.

Fourth. The picture develops well up to a certain point, and then gradually veils itself, a thin grey coating covering up the transparent portions, and destroying all hope of a really good picture. Cause, either insufficiency of acid in the developer, or else pushing the action further than an ordinary iron development will bear.

(Cases of this kind, where a slight fogging has set in before the image has acquired the necessary strength, may be subjected with advantage to a treatment of bichloride of mercury followed by cyanide of potassium, in the manner which I have elsewhere described.)

Fifth. There is a very interesting species of fogging, differing altogether from any of the foregoing, the origin of which has been the subject of considerable speculation and discussion. This sort is not general, but local; irregular figures are formed, somewhat resembling the figures in marbled paper, but which have been exceedingly well figured in an editorial article in the *British Journal* some time last summer. One particular characteristic of this sort of fogging which, I do not think, has been before pointed out, is that these marks are always more metallic in appearance than the rest of the surface.

In the editorial article which I have just referred to, these marks are ascribed to peculiar conditions of the collodion film. They are said to occur most often in plates that have waited for some time between sensitizing and development; and it is remarked that on such plates, if closely examined before development, marks somewhat similar to the stains here spoken of will be found, and are supposed to be attributable to partial and unequal drying away of the bath solution.

I have already expressed my opinion in print that, while this cause may occasionally operate, and may have something to do with the formation of stains (the article just referred to states that plates on which the marks that are there described have shown themselves will afford stains by development even without exposure—an important fact, which I shall advert to again presently), yet stains having the characteristic appearance which are there so correctly figured will make their appearance on plates with which the sensitizing, exposure, and development have followed in rapid succession.

Professor Towler some time since published an editorial on the same subject, interesting, and bearing the marks of close observation. His explanation differs from mine in this only: he has given the proximate, and I the ultimate cause, as I believe, of this annoyance.

I attribute the production of this sort of stains to the use of a developer stronger than the actual condition of the particular plate would bear. I was led to this conclusion by the following observations:—

I made a number of experiments some time since with a developer differently constituted from any that has ever been suggested. My developer contained a large quantity of *acetate of copper*, and I tried it for the following reasons:

It is a well-known fact that proto-acetate of iron is a powerful reducer and developer. The only convenient way of forming it hitherto employed has been to add acetate of lead to sulphate of iron, and remove the sulphate of lead which precipitates, by filtration. This developer has never come extensively into use, but has been favourably commented upon, and I observe that M. M. A. Gaudin has lately been experimenting with it, and calling attention to it.*

Also, it has been stated, apparently on good authority, that sulphate of copper in the developer exercises a favourable action on the density of the image.

It occurred to me, therefore, that I might combine these advantages by using at once protosulphate of iron and acetate of copper.

The first question which arises is, What takes place when these substances are mixed in solution? We have the strongest acid combined with the strongest base already, in the sulphate of iron. The conditions, therefore, for double decomposition are not favourable, seeing that there is not, as in the case of the lead salt, an insoluble substance to be precipitated and removed from the solution.

Of late years the opinion has prevailed among chemists that when two salts are mixed in solution there is formed all the possible combinations of acids and bases which the constituents permit, and that these, supposing them all to soluble, all co-exist in the solution.

Now, in the present case, all the possible compounds are soluble. It is, therefore, probable that such a solution as I mention would contain sulphate of iron and acetate of iron, sulphate of copper and acetate of copper.

Its action I found to be such as would be anticipated from the foregoing explanation of its constitution. It developed very powerfully, flashed out the pictures with much softness and detail, but fogged them, I might almost say invariably, although free acetic acid was added. I am not at all sure, indeed, but what this developer might be advantageously used, in a diluter form (I used it very strong) than I employed. But at that time my experiments with the gelatine developer had acquired so much interest to me that I stopped my trials with this one, and now only advert to it because it elucidates the point in question.

For the fogging produced by this developer was invariably of the kind now under consideration. I would get a perfectly clean plate in every other part, but ruined by a fog-mark—generally only one—of some extraordinary arabesque pattern. This I ascribed to the excessive strength and energy of the developer, and have since always attributed that sort of fogging to that cause.

Prof. Towler is of the opinion that this sort of stain is not formed upon the plate, but in the developer; that they are brought into contact with the film by the oscillating motion given to the plate to insure equal action, and then adhere to it.

Some observations which I have quite lately made confirm the opinion I have all along entertained, since reading his paper, that he is right.

I recently took some strong developer, and added to it a portion of bath solution, placing both in a small, clean, porcelain basin, so as to watch the operation of fogging by clear daylight.

I then saw distinctly that with certain kinds of developer there would form, after a lapse of twenty, fifty, or sometimes of sixty or eighty seconds, on the surface of the liquid, floating figures of a description exactly similar to the appearances produced by this sort of fogging upon the plate. They consisted of groupings of particles of metallic silver, changing their shape and figure at every instant, but always having a resemblance to the figuring of marbled paper, which is made, as every one knows, precisely in a similar way, by the distribution of coloured films on the surface of water, from which they are transferred to the surface of the paper.

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* I should, therefore, perhaps remark that the experiment here described was made in the winter of 1864—5.

Just in the same way, these curious silver figures are presently transferred to the surface of the plate, to the inexpressible annoyance and discomfiture of the operator. Why films thus loosely deposited should adhere with such tenacity to the collodion it is difficult to say. Perhaps they are presently soldered fast by the advancing deposit of silver.

Almost all developers, when examined in this way, by daylight in a capsule, showed a tendency to this form of fogging, if their action was continued long enough. Developers which quickly become muddy, show these figures simultaneously with the muddiness, but they were smaller and less marked. Strong and well-balanced developers did not show them nearly so soon, but they were larger and most conspicuous, and *would present themselves when there was not the slightest turbidity in the liquid.* This was very curious; it seemed like a sort of reversed development—a development upward instead of downward.

Any one who is inclined to doubt that the explanation here given is the true one, may advantageously repeat the experiment in the manner which I have above described, when I think he will find that the exact resemblance of the figures which gather on the surface of the liquid, to those which he may have seen upon his negatives, will carry a conviction to his mind that they are one and the same thing.

After detecting the source of any trouble, the next thing is to seek for a remedy. A *tour de force*—in plain English, a "dodge"—has occurred to me, by which this trouble might be avoided; but as I have had no trouble of this sort for a long time, I have had as yet no opportunity of trying it. I shall, therefore, not speak too confidently or positively about it, further than it seems to meet the requirements of the case,

These spots first form and show themselves on the surface of the liquid, on which they float freely. When the plate is tilted, in order to pour off the developer, they do not follow the liquid, but the latter slips out from between, and deposits them delicately on the film. It would seem, then, that if the plate were carefully watched, keeping the eye on the surface of the film as well as on the developing image, and the moment a tendency to the formation of these figures was detected, the operator, instead of pouring off the developer, was to quickly set the plate (always holding it quite level), under a good stream of water issuing from a rose, these figures *could not get down* to the film. It is not their nature to sink through; they seem to adhere to the surface, and only reach the film by being left behind by the retiring wave of water, and then the whole stratum of developer is suddenly washed away by a stream of water which floods the whole surface; the floating figures must be carried away without an opportunity of fastening themselves to the film.

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RECOVERY OF NITRATE OF SILVER FROM WASTE PAPER.

BY L. H. LAUDY, CHEMIST.*

THE process that I am about to describe is one that I have repeatedly used, and find the solution to work well.

The paper is first reduced to ashes in the usual way; it is then placed in a convenient vessel, and nitric acid is added—the amount of acid being in proportion to the richness of the ashes.

If, in the course of twenty-four hours, the silver is not all lifted, add a small amount of chemically pure nitric acid until the remaining silver is entirely dissolved.

Dilute this solution about one-half with water; place on the fire, and evaporate to dryness, to expel the acid.

As soon as cold, add water, and neutralize the remaining traces of acid with bicarbonate of soda; then filter and stand in the sun for about two days, or until the organic matter is entirely precipitated; filter, and add water to make forty-five grains to the ounce.

I do not recommend this process for paper silvered on twenty-grain solutions, as the amount of organic matter is in too great an excess. But for paper rich in silver this mode of operating is preferable to the reduction by heat.

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ON A MODE OF TESTING THE PERMANENCY OF PHOTOGRAPHIC PRINTS.

BY M. CAREY LEA.*

MORE than a year ago I found it necessary to devise some satisfactory test for the permanency of paper positives, and was unable to find any advice upon the subject, even in our best text-books, which seemed really useful. One of the tests which I tried and adopted has seemed particularly valuable. It was my intention to have described it and my method of using it earlier, but a press of other occupation has prevented me. This has had at least the advantage of enabling time to test the accuracy of its indications; and the result has been altogether satisfactory.

The substance which I employ is *dilute nitric acid.* The object was not to dissolve out metallic silver, which would have constituted a very false criterion, but to attack the weaker portions of the picture—those that suffer by the action of time and the atmosphere. It was found that when pure nitric acid, sp. gr. 1.28, was diluted with twenty-four times its bulk of water, a fluid was obtained which had no action upon even very finely divided (precipitated) silver, and which, nevertheless, by continued action, destroyed weak prints.

On examining now, at the end of fifteen months since the first experiments were made, the specimens tried, it is found that of those prints upon which the acid acted powerfully (the sulphur-toned), the *remaining halves,* which had been carefully preserved for comparison, and which had undergone no chemical treatment, *are faded.* I am, therefore, to that extent further confirmed in the belief that this test is reliable.

Yet, it is to be observed, that although "sulphur-toned" prints are thus completely destroyed by nitric acid diluted to the point just mentioned, still *sulphide of silver* is not at all attacked by it.

To illustrate upon this point, some sulphide of silver was precipitated by hydrosulphate of ammonia from the nitrate, was carefully washed, and, while still fresh and moist, was exposed to the action of the dilute acid. After remaining in contact for twenty-four hours in a warm room, the solution was tested for silver, and found to contain none. It thus appears that, even under the most favourable conditions, this dilute acid is incapable of oxidizing or altering even freshly precipitated sulphide of silver. Clearly, then, the weakness of sulphur-toned prints depends upon the presence of something else than sulphide of silver.

It may be said, that sulphide of silver formed in the *presence of organic matter,* such as is always present in albumen prints, has different properties, and acts in a different manner, and that the weakness of sulphur-toned prints depends upon this. Some view of this kind is, I think, held by the distinguished French photographer, M. Girard.

To test this point, I took some sensitized paper, and converted the whole of the nitrate of silver into sulphide with hydrosulphate of ammonia. This paper, uniformly black, was then exposed to the influence of the dilute nitric acid for five days; but no sensible lightening of its colour was visible.

A point essential to be attended to is, that *pure* nitric acid shall be used, and especially acid free from the lower

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Humphrey's Journal.

* *Philadelphia Photographer.*

oxides of nitrogen, as any hyponitric acid present greatly increases its oxidizing power. The acid proper to be used is that which is prepared expressly for chemical analysis.

It will probably be found that this method offers, perhaps, the simplest and most effectual of all tests of the permanency of photographic prints. The great advantage is, that while it acts as an oxidizer of some power, it will not attack metallic silver, and consequently it spares those parts of the picture which we know by experience to be right, and directs its action to those substances whose presence, if they are there, we wish to detect.

The test is applied in the following manner: The print to be examined is cut into halves; one of these is placed in a wide-mouthed bottle, with a glass stopper, and the dilute acid is poured over it. The print can be examined at any time after immersion. A really good print, when taken out after two weeks' immersion, dried, and compared with the other half, ought to show no loss of strength whatever. Sometimes, indeed, the tone may be slightly changed, may even be darker than before; this unimportant. But the print, after this prolonged treatment with the dilute acid, should have lost no particle of force and beauty.

I propose shortly to publish a description of the action of this and other tests upon prints produced by a great variety of processes, in which experiments great pains have been taken to secure exact comparative results.

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THE PRINT.

BY PROF. TOWLER.[*]

Much excitement has been made at various times about the permanency of the silver print, partly caused by the fading of numerous specimens from careless manipulation, and partly from the introduction of another sort of print that was to supersede the old mode of printing, which, of course, had to be decried, calumniated, and utterly annhiliated before the new thing could get a foothold. Because certain charred stakes have been found in the Roman embankments and water-works, evidently in a high state of preservation, it is argued that carbon prints—and these alone—will be permanent; and it is maintained, that all our energies and developments ought to take this direction, the direction of ferreting out and perfecting some carbon process. Because an elephant has been found entire, with skin, hair, and trunk, and all the *et ceteras* in perfect connection, and attachment, embedded in ice near the North pole, might we just as properly argue that a print on the dermis of this animal would be the most permanent. Whatever is exposed to heat moisture and air is doomed to decomposition and decay; this is the order of Nature—continual change! Even so with either the silver print or the carbon print, and the decay of the latter is more rapid than that of the former as long as it is fixed in gelatine for its matrix. But these are extreme views on the subject elicited by the extreme and unnecessary excitement on the subject of decomposition and change in silver prints. If the silver print be prepared with care and in accordance with the present amount of our knowledge on the subject, the permanency of the print will not be disputed; it will last as long, with appropriate care and provision of surroundings, as any other ordinary human combination, either mechanical or chemical. Take courage, therefore, and don't fall into black and gloomy thoughts about the future—"Sufficient for the day is the evil thereof."

By a photographic print, we mean one on paper, unless otherwise qualified: the daguerreotype is on a silver surface, and a transparent positive on glass; these are all prints; but the one on paper is the subject of our remarks. But paper itself will soon crumble to dust! Bah! And so will the earth, and the moon, and the sun itself, if you could only wait and see the result. There is nothing permanent, unless it be the ghosts of the imagination, which, for aught we know, may be the photographs of another age, that has existed, or may hereafter exist in the revolutions of matter and phenomena.

The silver print, in the common acceptation of the word, is a permanent picture which may be handed down to the third and fourth generation, a vigorous emblem of the past, like a mummy from the pyramids of Egypt. It is prepared as follows:—

The finest paper, and paper of the most uniform and even texture, is required for this purpose. This paper may be previously treated, so as to make it impervious to liquids in a great measure, by first floating it upon a solution of gelatine, which is afterwards made insoluble in a solution of alum. In some cases a quantity of white powder, such as oxide of zinc, is ground up in the gelatine, and the paper is coated with this solution, and the film is afterwards indurated, or rendered insoluble, as before, with alum. Paper prepared in this way is called enamelled paper. The next operation is to coat the paper with the proper chemicals for producing the photographic image. The solution of the salts for this purpose may be quite plain, as in water, or it may contain either gelatine or albumen in water; and the salts, which are used are the soluble chlorides. The chlorides of the alkalies and of the alkaline earths are soluble. Thus we have for our choice the following chlorides:—

Chloride of potassium, chloride of sodium, chloride of lithium, chloride of ammonium, chloride of rubidium, chloride of calcium, chloride of strontium, chloride of barium, and chloride of magnesium.

It is not of very great consequence, in point of difference in effect, which of these salts is used. The object is to obtain from one of these salts an insoluble chloride of silver in its stead by means of double decomposition. Covering the paper with a solution of one of these salts, is called salting the paper. The most ordinary solution is a mixture of chloride of ammonium in albumen, or chloride of barium in the same menstruum. If the paper has already been either simply gelatinized and tanned (so to say), or gelatinized, tanned, and enamelled, a very weak solution of the chloride is all that is needed, because the solution remains on the surface; but for ordinary plain paper, a more strongly salted solution is required. The paper that you buy has not been gelatinized; but you can buy enamelled paper. We will take the most ordinary case, plain paper, and prepare the salting solution accordingly:—

Salting Solution for Plain Paper.

Albumen (white of egg)	20 ounces
Chloride of barium	3 drachms
Citric acid	30 grains.

The white of egg is intimately beaten up to a froth, and then set aside to settle; after twelve hours' subsidence, the proper quantity is decanted and mixed with the salt and acid.

This mixture forms a very brilliant surface, but it is not so easy to manipulate with; it is very viscous, and is apt to produce bubbles. The acid renders it more fluid; two drachms of glacial acetic may be substituted for the citric acid. For card-pictures and other similar small photographs un-diluted albumen produces the most brilliant effects; but for large photographs a diluted solution of albumen is more appropriate. The following formula is adapted for the purpose.

Albumen	16 ounces
Water	4 ,,
Citric acid	30 grains
Chloride of barium	3 drachms.

Either of these solutions is poured into a large porcelain, gutta-percha, or shallow wooden dish, sufficiently capacious to hold a single sheet of paper; that is, about 24 inches long, by 18 inches wide. The wooden dishes are easily made, painted, and varnished, and are then almost as good as a more expensive article. Each sheet of paper is made to float upon the solution for about three minutes; but great care is required to lay the sheet down without producing bubbles of air; and, if such are produced, to remove them with a glass rod. Each corner of the sheet is raised in rotation as far as the middle, and that portion of the sheet is examined for bubbles, and then let down again upon the fluid as soon as they have been removed. After the three minutes have expired, the salted sheet is taken up, allowed to drain, and then hung up by two corners, by means of two clothes' pins, on a line to dry. Paper prepared in this way, will keep for a long time in a perfectly dry place. Salted albumen paper can be had of almost all our photographic dealers, as well as salted gelatine paper; but the manufacturers are continually changing their formulas for the preparation of the paper which they sell; and hence photographers can seldom get the same results twice in succession with the paper purchased from the same house. Otherwise it would be far more advantageous to buy your albumen paper already salted than to prepare it yourself.

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[*] *Humphrey's Journal.*

The next operation in turn is to excite or sensitize the albumen paper; and for this purpose we require a silver solution, which is prepared as follows:—

Silver Bath for Albumen Paper.

Nitrate of silver	4 ounces
Rain water	28 „
Alcohol...	1 ounce.

This solution is easily prepared; use the purest nitrate of silver. The alcohol is supposed to prevent the albumen from being dissolved off, and to render the film more porous and consequently less liable to blister in the subsequent operations; it may, however, be left out, if there is no tendency to either of these troubles. Each salted albumen sheet is made to float upon this solution for one minute after the sheet has been properly laid down, and examined at each corner for bubbles, as you were directed to do in the preceding operation of salting and albumenizing. The sensitizing operation is performed in the non-actinic room, or by candle light. The sheet is hung up to dry as before, after thoroughly draining, by clamps to a cord stretched across the room or along the wall. By this operation of exciting, the chloride of barium has been converted into chloride of silver, whilst nitrate of baryta, takes the place of nitrate of silver, one portion of which remains on the paper, and the other in the bath solution, which gradually becomes contaminated thereby. As soon as a number of sheets have been sensitized, a drachm or two of crystals of nitrate of silver are added to the solution to make up for the loss by gradual exhaustion. Paper sensitized in a plain silver solution as above given, will keep for a long time in a dry atmosphere, and without changing colour.

Many of our operators subject the sensitized sheets of paper, when thoroughly dry, to the fumes of ammonia, immediately before they are required for use. This operation is supposed to make the paper more sensitive, but it certainly does not produce a better picture. The fuming operation is quite simple. A large cupboard is just the place for the operation. The dry sensitized sheets are hung by clamps or pins around the cupboard, or on lines, and a saucer is placed at the bottom containing a drachm or two of ammonia, according to the size of the cupboard. The door is then closed for ten minutes or a quarter of an hour in winter, and for about five minutes in summer; after which the sheets are taken out, and hung upon lines to air. In this condition the paper soon changes colour in summer; it will not keep white for more than one hour or two.

After the silvering solution has been used, and has done the work for the day, it is poured into a large stock bottle, containing a quantity of chloride of silver, precipitated from an old silver bath, and kept in the dark room. This chloride of silver, when shaken up with the nitrate of silver, removes any organic material that may have been produced by the albumen on the paper, and carries it to the bottom as it settles. This method is altogether better than kaolin or anything of that kind, because the chloride introduces no foreign material which might subsequently be injurious. It is possible, too, that a small portion of the chloride is dissolved in the nitrate of silver, and hence becomes beneficial, or aids in sensitizing. Without this precaution the silver solution will soon become black and unfit for use. After the bath has been long in use, it is better to reduce it to chloride, and prepare a totally new solution.

(*To be continued.*)

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REMOVAL OF DEVELOPER STAINS.

BY O. G. MASON.*

In reply to many inquiries as to some means for the removal of the spots known as developer stains upon clothing, I have recently tried a few simple experiments, which have led me to adopt the following process, and while reading it many may say that they practise some preventative which is better than any cure. Yet nearly every operating photographer carries with him ample proof of his acquaintance with that darkness wherein silver, acid, and iron, are ever ready to place their signature upon all immaculate intruders.

Nearly all photographers understand the process for removing silver stains, while most are either ignorant of, or do not practise, any process for obliterating the quite as common and unsightly ones caused by iron developer.

In these times of high prices, Franklin's "a penny saved is as good as a penny earned," may be remembered with advantage to the pocket of many a photographer, who has spoiled a valuable suit of clothes by presuming to make "just one picture," without taking the precaution of first dressing in his chemical suit.

To such, a cure may be of use.

First, damp the stained part of the cloth in water, then apply a weak solution (15 or 20 grs. to the oz.) of tartaric acid in water, and lay the article in bright sunlight, keeping the spot wet with this acid solution, until the stain is removed, which will require from a few moments to one or two hours, in accordance with the intensity of the stain.

In case silver and developer are in close proximity or superimposed, first remove the silver by the proper agents, then thoroughly wash the fabric until no trace remains of the agent used in the removal of the silver.

Then apply the acid solution, as in the case of iron developer stains alone. Thus, with a few cents' worth of acid, and a little time, valuable articles of clothing may be restored to their lost position in the wardrobe.

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PRESERVATION OF FRAMED PHOTOGRAPHS AND DRAWINGS.

A correspondent of the *Athenæum* says:—I have long been intending to write to you on the present destructive plan of framing water-colour drawings and prints, and to point out a preservative. It is commonly the practice to paste paper, or a thin board secured by paper pasted, to exclude dust, air, and, I suppose, damp; but that very plan is the cause of mildew, and the consequent destruction of both valuable drawings and prints. It is not possible to exclude damp otherwise than by keeping the room always heated to a certain temperature, particularly in country houses, where the changes of air are greater from dry to damp, and *vice versâ*. Hanging drawings over a chimney-piece, or against inside walls or partitions, will not exclude damp, unless a good fire is kept in the room daily throughout the year; the reason is this, drawings and prints, like other things, are subject to the changes of the atmosphere. When the weather is damp (which it always is some part of the twenty-four hours, winter and summer), the moisture is absorbed by the paper pasted on the back of the picture, and thence it is conveyed to the drawing inside; when the change to dry takes place, the outside may become dry, but before the drawing can become dry, the outer paper back must re-absorb the moisture from within, to be again absorbed by the air. Now that is a process which will take considerable time, and, in all probability, the outer cover becomes again damp from the air before it can have re-absorbed the moisture from within; the print or drawing thus becomes continuously damp, and consequently mildewed. It is the same with books and clothes in drawers; they absorb damp quickly, but part with it very slowly; the reason of which is very obvious—they are not acted upon by a free circulation of air. No moisture will cause mildew where it can be rapidly evaporated; tie a piece of paper to a string, and hang it in a place subject to all changes of the atmosphere, permitting a free circulation of air around it, and it will never become mildewed. So it will be with prints and drawings; they are not prevented from absorbing moisture, and they are not permitted to become rapidly dry again, by reason of the air-tight case not admitting of a free circulation of air. This I have proved by drawings in my own house, which is subject to a salt air from the sea. The plan is, to have no air-tight covering to the back, but let the drawing be fixed by a few tacks about one-eighth of an inch from the glass, and free all round the sides, so that the air can freely circulate; and to keep out the dust, tack a sheet of paper on the back, three or four tacks at the top, and one on each side about the middle. This will sufficiently exclude dust; and in hanging against a wall the frame should project a little from the wall at the top, and by the means of two small nails, either driven into the frame at the bottom, or into the wall, projecting about half an inch for the lower part of the frame, to rest against and keep it from the wall: this will prevent any stagnation of air and consequent dampness at the back of the picture. If any of your correspondents, who are troubled with mildew, will adopt this plan, they will not only never regret it, but owe you thanks for the information.

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* *American Journal of Photography.*

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 25th September, 1866.

The works for the Universal Exhibition, which will be opened on the 1st of April, 1867, are advancing with amazing rapidity. Not only is the iron frame-work of the galleries of the Palace now terminated, but in a few days the different departments will be delivered over to the delegates of all the classes, for them to proceed to the execution of the internal arrangements and decoration. The park of the Champ de Mars already begins to assume something of its definitive appearance. A great number of trees have been planted,. The river which is to meander through it has been marked out, and the turf laid for the grass plots. As for the numerous establishments of all kinds which are to be contained within its enclosure, they are already in course of erection. On the left of the Pont d'Iena, a Catholic church, in which all objects connected with public worship are to be exhibited, approaches completion. The International Club, on the right, encloses within its four walls a vast area near the station of the railway, which will bring visitors from all the railways by means of the circular line surrounding Paris. On the right and left of the principal entrance from the Pont d'Iena will soon be erected the eight pavilions for the International Photographic workshops. The immense establishment of Pierre Petit is already rising from its foundations near the Avenue de Labourdonnaye, on the north and west of the Champ de Mars. The torrents of rain which have fallen almost incessantly for weeks past have hindered, but not suspended, the progress of the works.

Perhaps your readers will take an interest in learning how Pierre Petit has organized his immense undertaking. As he announced from the first, he has endeavoured to secure the co-operation of his brother photographers for the various specialities in which they excel. For instance, he has confided to MM. Léon Levy and Co., the successors of Ferrier and Soulier, everything connected with stereoscopic pictures. M. Bisson, Jun., will take all the views, from those of the largest size to simple cartes-de-visite. M. Michelez, the rival of M. Bingham, is exclusively charged with photographing the exhibition of fine arts, and will have to reproduce the paintings, drawings, sculptures, &c. The printing of all the *clichés* will most probably be entrusted to a single contractor, and the paper required will be made by one manufacturer. Lastly, Petit has arranged with Lemercier for the lithographic printing, and with Baroux for the wood engraving from transfers of photographs.

Each operator will have to organize the work of his own department, subject to the regulations and tariffs imposed by the Imperial Commission. Each of them will also sign his productions, which will be at once a guarantee for the operator and the public.

I consider this mode of proceeding the best that could be adopted.

MM. Léon Levy and Co. have already taken numerous views on glass, which are remarkable for their perfection and show the state of the works in the different stages of their progress. As the buildings advance towards completion, these views become more and more interesting; and they already enable us to form a tolerably correct idea of the aspect which the Champ de Mars will present next year.

One of the veterans of photography, who was the friend and pupil of Daguerre, M. Sabatier Blot, has just published a portrait of the illustrious collaborateur of M. Niepce.

This portrait, which is the reproduction of an admirable plate taken from life in 1844, eight years before Daguerre's decease, is a wonderful likeness.

Thanks to this publication, which has been delayed too long, photographers may now have in their workshops an authentic likeness of the inventor who was the first to practise the art they profess, and thus created an inexhaustible source of wealth. Ernest Lacan.

SILVER IN THE WHITES OF ALBUMEN PRINTS.

Dear Sir,—I beg you will afford me an opportunity of making a few remarks upon the subject of Mr. Carey Lea's communication to the *Philadelphia Photographer*, which was reprinted in your journals of the 17th and 24th ultimo, and entitled "An Examination into the Circumstances under which Silver is found in the Whites of Albumen Prints." The writer in question, although anxious to "save others the trouble of making similar investigations," is not probably aware that he has been but repeating experiments, the results of which have already been placed on record. It is four years since the existence of silver in an unsuspected form in the whites—and, indeed, all parts—of albumen photographs was pointed out by me;[*] yet the author now speaks of it as "a well-known fact, though only lately ascertained;" and proceeds to rehearse, without acknowledgment, my old experiment, by which he finds no difficulty in proving that the albumen-argentic compound is formed in the process of sensitizing the paper, and quite independently of the action of light.

After making this assertion, Mr. Lea proceeds to the trial of a number of chemical substances, with a view to their application as solvents, either before or at the time of fixing, which were found, as in my experiments long since recorded, of little or no practical value in the removal of the silver. So far, then, the results of our separate trials show a general agreement; but Mr. Lea proceeds farther to test the efficiency of various methods of fixing, and arrives at the conclusion that the most permanent photographs, and those containing least silver (or even none) in organic combination, are obtained by the use of the old toning and fixing bath of hyposulphite of soda to which chloride of gold has been added. From this opinion I entirely dissent, and give my reasons for so doing. Firstly, because the pictures produced in this way are, as a rule, discoloured in the whites, and cannot therefore show in so marked a manner the yellow stain due to the action of the test—sulphide of ammonium. Secondly, because a lengthened experience of this identical process (which was in common use from seven to ten years ago) has always given me proofs in which the amount of argentic compound exceeds that contained in the pictures of to-day, produced by methods in which the toning and fixing agents are applied separately. It is possible that the specific instructions given under 10[†] for the preparation of a hot solution of gold and hyposulphite, which is to be "used two or three hours after mixing," imply that it may be somewhat above the common temperature when the prints are immersed, and so may partake of the advantage necessarily resulting from the greater solvent powers of the hyposulphite under such circumstances; but, on the other hand, this effect is always attended with a general loss of vigour, and entails a proportionately longer exposure in the printing-frame. By the use of this bath it is said that in one instance "a print was obtained of which *the whites were perfectly free from silver.*" With regard to this statement, I would direct attention to the fact that the *first* and *last* proofs of any batch immersed in succession in the same fixing solution differ widely in respect to the proportion of silver retained in the whites; and although I have been able to produce single pictures, or a small parcel, comparatively free from silver, by the use of an extremely liberal amount of the hyposulphite, or other fixing agent, it is manifest that the principle is not capable of extension to commercial operations on the score of cost. We still require some supplementary agent—such as the carbonate of ammonia, or a better one, if it can be found—to augment the solvent action of the hyposulphite; and of all the substances available for this purpose, I should condemn, from the results of my experience, the use of terchloride of gold. The writer seems, indeed, to admit, in his concluding paragraph, that he has failed in the object of his search, for he says:—"It follows, therefore, that no substance (as far as these experiments go) is capable of dissolving out the silver from the albumen."—I am, &c.,

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[*] See Photographic News, Vol. VI., p. 470, Oct. 3, 1862

[†] *Vide* Photographic News, p. 402, of present volume.

Woolwich, September 22, 1866. John Spiller.

MR. CLAUDET'S DISCOVERY.

Sir,—The issue raised in your last is a fair one. Priority of discovery must in all cases be decided by an appeal to published records. If the method described by Mr. Claudet at the meeting of the British Association, for obtaining more artistic portraits by means of the camera, were then for the first time published, to him would be due all the credit of the discovery, whether much or little. The fact that other persons had privately practised such a plan would not, I apprehend, be of any force in depriving him of his laurels. If, however, it be proved that such a method has been published, both at the Photographic Society and in your own pages, not only are the claims of Mr. Claudet and the novelty of the process set aside, but the wonder arises how "one of the greatest improvements which have been introduced in photography since its discovery" (I quote Mr. Claudet's words) should have failed to receive general recognition.

I now appeal to what I believe are generally received as authoritative "records" of photographic progress—the pages of the Photographic News. On page 284 of your last volume, in a report of a meeting of the London Photographic Society, at which Mr. Pettitt's system of "Photobinography" was brought forward, I find Mr. Jabez Hughes reported as follows:—

> "Mr. Hughes then referred to the old notion of Mr. Alfred Smee, of moving the camera in the arc of a circle, of which the sitter should be the centre, during the time of exposure, which he thought would give relief; of course it only resulted in a blurred, soft image. He also referred to a favourite idea, at one time, of the Rev. J. B. Reade, for getting depth of definition by moving the lens with the rack and pinion during the time of exposure, so as to get, alternately, every plane from the tip of the nose to the ears in the best focus."

Now, Sir, I do not write this for the purpose of charging Mr. Claudet with plagiarism. It would afford me small satisfaction to prove an honourable gentleman guilty of appropriating as his own the ideas of another. I have no doubt that Mr. Claudet published in good faith something which struck him as very valuable and novel; and I quite agree with you in crediting him with pluck as well as public spirit in giving publicity to such a dodge in an assembly of mathematicians.

But the important part of the enquiry is, if the plan in question be so valuable as Mr. Claudet, an accomplished and experienced photographer, thinks it, and as scientific men such as the president of the Royal Astronomical Society Mr. Glaisher, Mr. Brookes, and others taking part in the discussion at Nottingham, affirm it to be, how is it that, having been before practised and published, its merits have not been recognized? It is of more importance, I think, that the real value of the discovery should be fully ascertained, than that its novelty should be discussed. Are the results really good? Is the method legitimate? Are there unrecognized drawbacks? These appear to me questions worth determining.

I will conclude my letter with a suggestion which may, I hope, receive attention in the proper quarter. Mr. Claudet is, I believe, a member of the Council of the Photographic Society: will he bring the subject forward for discussion at an early meeting of that Society, stating his further experience, and showing his results? A brief paper, with examples, brought before an assembly of practical photographers, would surely evoke a discussion both interesting and valuable, and would afford a fair opportunity of comparing results obtained by this method and by others, such as lenses constructed to give depth of focus, like that by an eminent optician to which you have recently called attention. Very respectfully yours, Justitia.

[In our article on this subject we stated that the method had been tried before in various instances; but it had escaped our memory that any published allusion had been made to the matter. We agree with you in believing that Mr. Claudet brought the subject forward in good faith for the public benefit, its former publication having doubtless failed to come under his attention. Your suggestion is a good one. We should like to see the merits of the method fully discussed at a photographic meeting. We hope Mr. Claudet will bring the subject before the Society, and exhibit examples. With the possibility of such an examination of the question, we forbear entering into further estimate of its merits at present.—Ed.]

THE GELATINE IRON DEVELOPER, ETC., IN INDIA.

Dear Sir,—I wish to add my mite to the general acknowledgment, that has been given at home, of the efficacy of gelatine in the developer. In whichever way prepared, I have found it valuable; but my idea is, that the formula of "Clericus" and Mr. Hughes is the form most adapted to this hot climate. (I cannot tell you *why*; I simply speak as to the results obtained.) It seems to do away with the harshness of Indian landscapes in photography, a result which was only too often obtained. The other preparations, such as that of Mr. Carey Lea, are often "too much" for the negative, giving, as a rule, too much intensity. Whichever one of the formulæ is used, however, I find that pictures can be taken with it in such a heat that plain iron developers would be useless, owing to the fog that would ensue. In my tent, with the thermometer standing at 114°, I have brought out satisfactory pictures by using the gelatine restrainer, which could not be said of those tried with the ordinary restrainer.

Gelatine in the printing bath, I have found, gave, after sensitizing paper once, the solution a dark brown tint, which could not be removed by any means I was acquainted with. I have given up using it.

We are very much behind, out here, in the new printing processes. I have not seen a collodio-chloride print yet, which has been executed by any one in India, and every one seems "waiting till they go home" to learn the details. I hope some one will soon come back with the required information, as I am anxious to prevent my albums becoming of that fine yellow tint we all know so well. I have sent home for paper and materials, which I expect soon, and then I shall set to work. Carbon-printing is also *almost* unknown here: I believe I am nearly the first in this Presidency who has tried it successfully as yet. It is such a trouble, though, to go through all the manipulations required, and one's temper is not improved by the heat or by failures.

I finally wish to denounce camera manufacturers as a body. I have just had a new camera out, by a *first-class* maker. As I lie in bed, I hear in my next room such creakings and crackings, which now I have got used to. On enquiring of my "boy" what it was, he answered, "Oh, sahib, tampari tasuri péti, toute-gaya" (Sir, your picture-box is broken); and true enough, it was; the wood was badly seasoned, and it had gone to ribbons. It is too bad, because we can't choose things for ourselves, that the rubbish should be sent out here. Indite an article on the subject, and then, perhaps, something will be done.—I am, &c.,

Bombay, August 21, 1866. R. E.

[It is our conviction that carbon printing is the true remedy for instability in photographs, and that it will eventually be generally practised amongst first-class photographers. We always regret to hear of the victimization of photographers far from home, where it is difficult to replace necessary goods. We cannot but think, however, that there are some manufacturers who produce cameras which will actually stand the Indian climate. Possibly, fuller information on the necessary conditions would often be useful to manufacturers. We shall have pleasure in receiving the communication on your tour, &c., referred to in your postscript.—Ed.]

Photographic Notes and Queries.

Albums for Cabinet Portraits.

Dear Sir,—Now that the cabinet picture bids fair to be introduced into the provinces, do you not think that it would be a great assistance to us if the manufacturers could make an album which would be more within the reach of the great majority of our connexious?

At present the only album we get in this town is one guinea. Allowing us a small profit, we cannot offer it to our customers for less than twenty-three shillings, and at this price they are not likely to assist in making the cabinet picture a really popular one.

You will see by the enclosed circular that we are doing our best to introduce this very nice size to our customers and the public generally, and hope that our confrères will do the same thing.—We are, &c., Clifton & Hart.

11, *Union Street, Sheffield.*

[Undoubtedly one of the conditions of a successful introduction of the cabinet portraits will consist in the issue of albums at a reasonably low price. We are uncertain of the price at which Messrs. Marion and Co. now manufacture such albums, but we publish this note in order to call the attention of persons concerned in the manufacture of albums to the want at present existing.—Ed.]

Wetting Dry Plates Before Exposure.

Dear Sir,—In your number of the Photographic News, your correspondent, Baynham Jones, writes on "Wetting Dry Plates prior to Exposure." His directions are all very clear to me except the following words at the end of the third paragraph, thus: "After exposure, return the plate to the box, and *repeat* the *operation*."

Does he mean, continue the operation of developing? If not, then I cannot understand him. Will Mr. B. J. have the kindness to say whether he develops with iron, or silver and pyro; and also whether he prefers leaving the plate to dry spontaneously, or by the application of heat?—Yours truly,

Apothecary, &c.

Morpeth, Northumberland, Sept. 23*rd*, 1866.

[By "repeating the operation," Mr. Jones clearly means proceeding with another plate in the same way. On the other points perhaps he will kindly furnish information.—Ed.]

Talk in the Studio.

A Gigantic Glasshouse.—It is stated that the glass required for the Paris Exhibition next year would cover an extent of twenty acres.

Nude Art in Spain.—By a recent decree issued in Seville, reproductions by photography of the *chefs-d'œuvre* of art, either statuary or painting, if in the nude, are strictly prohibited in all the shop windows. But the effect on the population of Andalusia, who swear quite as terribly as "our army in Flanders," is said to be most obnoxious.

Cabinet Portraits.—In a letter received from our esteemed friend, Mr. E. L. Wilson, Editor of the *Philadelphia Photographer*, he states that an example of the cabinet portraits we had sent is much admired, and that he believes that the new size will become a decided favourite with our transatlantic friends.

Alkaline Development for Fothergill Plates.—A correspondent writes:—"The following is an excellent way of developing Fothergill plates prepared on the system of thorough washing. Commence development with a 2-grn. sol. plain pyro, to which add, immediately before use, a very small modicum of carbonate of soda; let this lie on the plate till a faint general image is seen by *reflected* light (say about five minutes) then wash and continue with ordinary acid pyro solution, using as little silver as possible at first. I have lately used this plan with considerable success, and find by it little more than *half* the ordinary exposure is required.

The Carbon Process in France.—The Editor of *La Lumière* says:—"I yesterday witnessed the printing of some very large pictures by M. Despaquis' carbon process. I was informed, greatly to my surprise, that the process had lately been so much perfected that the time of exposure had been reduced to one-fourth or one-fifth of that generally required for chloride papers, an enormous advantage when applying the process for the production of enlargements. The film, notwithstanding its large dimensions (40 by 50 centimetres) was remarkably tough, and by no means liable to rupture; but it would doubtless be impossible for every operator to obtain a film of like solidity, which requires the employment of a special collodion. There is no doubt that M. Despaquis will turn his attention to the preparation of a collodion of the proper description, as this would be the best means of calling general attention to a process which seems particularly well adapted for use by amateurs, although at present it may not be altogether suitable for large establishments.

Extended Application of Photozincography.—In the consideration of the Writs Registration (Scotland) Bill by a select committee last Session, the question was raised whether the process of photozincography might not be applied to the copying of documents which are to appear upon the register. Colonel Sir H. James stated to the committee that a deed could be copied by this process at a third or a fourth of the expense of copying by hand, and of course there would be no possibility of error in copying. Several copies could be obtained at a very much lower rate than one copy, and it is obvious that greater security could be obtained by making several copies and depositing them in different places. Copies of documents may thus be obtained without risk to the original; there is no fire, no artificial light, and no risk of spilling a bottle of ink over the original. The original would also be less handled. The committee were of opinion that the Lord Clerk Register should be empowered, with the consent of the Treasury, to apply this process as a substitute for the engrossing of writs in the Sasine-office, if experiments should prove it to be available.—*Times*.

Methylated Spirits.—There is a provision in a recent Act of Parliament against the use of methylated spirits, either as a beverage or as a medicine. By the 29th and 30th of Victoria, chap. 65, it is declared that no person shall use methylated spirit, or any derivative in the manufacture, composition, or preparation of any article whatsoever capable of being used either wholly or partially as a beverage, or internally as a medicine, or shall sell or have in his possession, under a penalty of £100; and the article, as well as the vessel in which the same is contained, to be forfeited. The provision is not to apply to the preparation of sulphuric ether or chloroform, or to affect the power of the Commissioners of the Inland Revenue to allow methylated spirit to be used by persons authorized by them in such branches of the arts and manufactures of the United Kingdom as they may sanction or approve. No alteration is to be made in the mixture called "finish," made from methylated spirit.—*Times*.

Sulphur in Albumen.—Dr. A. Commaille, in an article in the *Mechanics' Magazine*, in speaking of the constitution of albumenoid substances, points out that raw albumen differs chemically as well as physically from coagulated. It has a different solubility in dilute acids, and it is certain that heat causes the elimination of a small quantity of a pecular substance, which is only imprisoned in the coagulated mass. This fact was pointed out by Bostock in 1808. A culinary experiment shows that cooking effects a dissociation of the principles of white of egg, or some peculiar change in the albumen. Silver is not affected in a raw egg, but everybody knows it is blackened in a boiled one. The author put a recently-struck coin in white of egg, and then heated it to coagulation in a water bath. The coin came out not only blackened, but corroded in places. Nothing like this was observed with the raw egg, or with the yolk, raw or cooked. M. Wurtz has pointed out that sulphuretted hydrogen is evolved during the coagulation of albumen, but the author is not certain that this gas alone gives the peculiar odour to hard eggs. He rather believes that there is a volatile substance which contains all the sulphur hitherto supposed to be a constituent of the albumen itself.

Another Photographic Mystery.—The *Scientific American* has the following :—" A. H., of Pennsylvania, sends us a copy of a photographic group of six young men, each having upon his head a stove-pipe hat. The position of the group is such that, in some instances, the face of one of the individuals is directly behind, and covered by a hat in front. One of the faces of the party is seen through the hat in front, which conveys the idea of a transparent hat. On the back of the picture is printed the following affidavit, purporting to be sworn to by the six :—' The undersigned, being duly sworn, depose and say, that the photograph on the reverse was taken without any attempt at fraud or deception ; the transparent hat being a common cassimere hat, and no opera or glass hat, and was not moved during the process.' Our correspondent says, ' I am anxious to know how it is possible that, under the existing circumstances, the photograph can show the face of one gentleman through the hat of another. If there had been anything of the mirror nature in the room, it might not be so hard to explain.' The ' transparent' hat evidently had a movable crown, which was put on after the face behind had been partly photographed. It would be difficult to explain how a mirror could have been used."

Cost of Chemicals Fifty Years ago.—A correspondent sends us the following extracts from the published price list of Frederick Accum, of Compton Street, Soho, which accompanies the " Practical Essay on Chemical Tests " of that author, bearing date, 1816. From these statements we are enabled to form a conception of the progress made in the chemical manufactures during the past half century, and of the impetus given to the production of a special class of articles by the demands of photography.

		£	s.	d.
Muriate of gold	per oz.	2	8	6
Nitrate of silver, crystallized ...	..	0	8	0
Do. fused ...	...	0	8	0
Sulphate of iron	...	0	0	6
Alcohol, sp. gr. 825	...	0	0	9
Sulphuric ether	1s. 6d. to	0	2	0
Acetic acid	...	0	1	6
Tartaric acid	...	0	2	0
Citric acid	...	0	2	6
Gallic acid	...	0	12	0

In describing the properties of this last-named substance, the author particularly states that " when exposed gradually to a gentle heat, it sublimes *without alteration !* "

Bromine was not yet discovered, and iodine only recently described. Phosphorus was sold at seven shillings per ounce.

Platinum, on the other hand, was rather cheaper than at present. The wire could be had at a guinea an ounce.

Soda salts were generally quoted *dearer* than those of potash ; ninepence and a shilling per ounce being the prices named for the carbonate and acetate of soda. These figures are in harmony with those stated by Dr. A. W. Hoffmann in his " Report upon Chemical Products and Processes." " In the year 1814, when Leblanc's process was first introduced into England, soda crystals were sold at £60 per ton."

In Accum's time, solution of nitrate of silver (price 2s. 6d. per ounce) was chiefly used " for illustrating the astonishing divisibility of matter." Sulphuric ether and spirit varnish were included in the list of sundries, or miscellaneous articles, likely to prove serviceable in a laboratory.

To Correspondents.

H. T. G.—The yellow stain of which you complain is produced by decomposed hyposulphite of silver. It may arise from imperfect fixation, owing to the print being imperfectly immersed, or perhaps stuck to another in the hypo bath ; but it is more probably due to some trace of hypo in the water in which the print was rinsed prior to fixing. Using the same dish for washing prints before and after fixing will often produce such a result.

Bandon.—Paper negatives are produced by a variety of processes, which are chiefly divided into the calotype and wax-paper processes. You will find articles describing manipulations in our former Volume. Some of the finest results ever produced on paper are Dr. Diamond's negatives by the calotype process. You will find details of his mode of working in our last Year-Book. Calotype negatives are made transparent by immersion in melted wax, and then being treated with a hot iron. They differ from collodion negatives chiefly in being somewhat less delicate, owing to the structure of the paper. Large plates may, with propriety, be excited in a large dish. Many of the French operators use no other method. One end of the plate should be placed in the solution, and then, without any pause, it should be lowered, face downward, into the bath, in such a manner as to drive away air-bubbles, forming on the surface, steadily before it. The bottom of the dish should be sufficiently curved to prevent contact, except at the edges of the plate. A silver hook is used to lower and lift up the plate. Another plan, more difficult to employ, however, for large plates, consists in the use of a flat cradle-bath or slipper-bath, or even an ordinary dish. The solution is tilted to one end, the plate laid face upwards on the bottom of the empty end of the dish ; the other end is then quickly raised, so as to cause the solution to flow with an even wave over the collodion film. 3. Enlarged negatives can be made by the solar camera. A transparency must first be made, and from that an enlarged negative. Perhaps the best plan would be to take an enlarged transparency on a collodion plate from a suitable negative, and from that a negative. But a solar camera is not necessary in producing an enlarged negative.

Troubled Correspondent.—The presence of free nitric acid in a printing bath is often a source of mealiness. It is also probable that the excess of washing before toning, which you describe, may cause some of your troubles. A comparatively slight washing, in two changes of water, before toning will be found sufficient. By all means avoid using the same dishes for washing before toning and after fixing. It is always well to keep all the vessels strictly to their own purpose. A very slight trace of hypo clinging to a dish used for washing before toning will cause irregular toning, and at times stains. The toning bath with carbonate of soda will often conduce to mealiness, especially if used too soon after it is mixed. If you use a bath containing free nitric acid, fuming will be useful. The mode of proceeding consists in placing a saucer with about an ounce of liquid ammonia at the bottom of a box, pinning the excited paper to the lid, and shutting it down for about ten minutes. Use carbonate of soda for neutralizing an acid negative bath. Strength and weakness in solutions are of course relative ; but a 10-grain iron solution would be a weak developer, and a 30-grain or 40-grain solution a strong developer. You should have sent us an example of your defective prints, and we could have advised you with more precision.

A Regular Reader.—The spots on the excited albumenized paper enclosed are caused by irregular drying of the paper, the irregular drying leaving drops of solution on the paper, which cause the spots. The horny, exceedingly dry condition of the paper is the primary cause. If the paper be kept for a few hours in a damp place before exciting, it will sometimes prove a remedy. Another plan is to blot off the free nitrate, before the paper is quite dry, with clean blotting-paper.

J. J. E. Owen.—The print enclosed is a very excellent one, with fine gradation and modelling, and very brilliant.

Amateur in a Small Way.—There may be one or two reasons for your strengthened and neutralized negative bath not becoming discoloured when used for exciting albumenized paper. In the first place, it probably contains alcohol, the presence of which tends to check discolouration ; in the next place, you have probably made it strong, and a strong bath is less liable to discolouration than a weak one. Possibly the nitrate of calcium formed in the course of neutralizing may have some effect, but we cannot with certainty say. It has been found that hard water containing salts of lime, when employed in making a printing bath, does not readily discolour.

M. Cage.—There is no method of printing illustrations in conjunction with the body of the text, as you describe, except by the use of woodcuts or analogous blocks. The descriptive matter will be printed on a large sheet of paper, at least eight pages at a time, and it would be very difficult to work such designs in their proper places, on such sheets, by the ordinary processes of lithography, &c. Photo-lithography would probably answer best ; but whether it would be sufficiently delicate, or whether the practical difficulties of working with such large sheets would interfere, we cannot say. It appears to us that your customer must either consent to the designs being pasted into their places, or else make several designs in one page, and number them for reference with the printed description. The Woodbury process would answer well in the latter case. If wood engraving be adopted, the image might be photographed on the face of the wood-block ; but then it would be at the mercy of the engraver, who might alter it in cutting. Boxwood for the purpose may be obtained of any wood engraver. The trial of collodions you mention is very interesting.

Tyro.—Dissolve one ounce of acetate of soda in two ounces of boiling water, and add as much sugar as it will take up, which will be probably nearly an ounce, and mix well. Then pour into a flat dish, and on cooling you will obtain fine crystals. You may add the remaining liquid to the developer without crystallizing.

W. S. Parry.—The cards, which are very excellent, duly received. Many thanks.

R. A.—Received, and shall appear in our next.

T. A.—Thanks. Will the papers have any specific photographic bearing ?

W. H.—In intensifying with Schlippe's salt, about twenty grains of the crystallized salt to an ounce of water will answer very well. It may be applied in the daylight without risk.

L. M. T.—The use of a strong iron solution tends to diminish contrast, and to give harmony. Slow development and weak solutions tend to increase contrasts. 2. Pyrogallic acid may be used with bromo-iodized collodion ; but a longer exposure is generally necessary. The print is very good.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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METALLIC SILVER STAINS ON NEGATIVES.

Dr. Anthony's communication, on another page, contains some important suggestions on a subject interesting to all photographers, inasmuch as there are but few who have not at some time or other been perplexed with the annoyance referred to. The kind of markings which Mr. Carey Lea, in an article which appeared in our last, styles local fogging—and which, since it is an abnormal deposit of reduced silver, is certainly in one sense fogging—but which are more aptly, we think, included under the designation of stains, generally present a surface of matt silver, and are at times in form like the pattern of marble paper; at other times somewhat like oyster-shells, and at times like slug tracks. At times, especially when occurring in the shadows, they may be removed by means of a camel's-hair pencil, or a tuft of cotton wool, without much injury to the negative, which appears perfect underneath them; but in some cases we have found that although the deposit of silver may be removed, the negative under such deposit is imperfect, the full acquisition of density having apparently been prevented by the deposit in question taking place at an early stage of the development.

Mr. Carey Lea., in the article to which we have referred, attributes this stain to the use of a developer stronger than the actual condition of the particular plate would bear; such a developer coming into contact with the free nitrate of silver on the plate, forming a metallic film of irregular shape, which is eventually deposited on the film, forming the silver stains in question. Professor Towler some time ago suggested an origin somewhat similar. He observed that in some developers a decomposition had taken place, in the course of which a glairy organic substance was formed, which on contact with the free nitrate on the plate produced a metallic film, which behaved like the film formed by a drop of gas tar on the surface of water; and that the solution, running off the plate from under the floating pellicle of silver, leaves it a stain on the collodion. Dr. Anthony attributes these marbled markings of dead silver to a condition of the nitrate bath in which an oily-looking scum arises to the surface of the solution, and adheres to the collodion film when it is withdrawn, and forms, on the application of the developer, the markings in question. For fuller details on this phase of the matter we refer the reader to Dr. Anthony's interesting communication.

The source of the evil to which Mr. Carey Lea and Professor Towler refer will, we have no doubt, occasionally produce such markings. We have, in fact, at times observed, as many photographers have doubtless done, the phenomena described. The developer, as it is allowed to flow backwards and forwards over the plate, is seen to be covered with an iridescent metallic pellicle, which at times eddies and swirls on the surface, and, if suffered to become deposited on the film, sticks there with great tenacity.

But this we are disposed to believe is a very exceptional cause of such stains. The cause described by Dr. Anthony is a much more prolific and common source of the evil, and when it is present its action may be very easily proved by applying the developer—any developer will serve—to the film immediately the plate leaves the bath, when the markings caused by the floating metallic scum will appear at once, the organic salt of silver, of which the scum probably consists, being immediately reduced in the marbled forms which such oily-looking films generally assume when floating on a denser solution.

There is, however, another source of markings very similar in character, which, in our personal experience, has been the most difficult to deal with. This consists in the formation of these matt silver stains on plates which require long exposure, as in copying or photographing interiors. In these cases the evil appears to be produced by more than one cause. It is probable that the partial drying of the film will at times produce this result by the concentration of the silver bath; and it is certain that the use of a weak silver bath in cases of long keeping of the plate before development is one of the best remedies for the evil. An eminent photographer recently mentioned to us, that in photographing the interior of a church requiring long exposure, he got negative after negative perfect in all respects except the presence of oyster-shell-like markings of dead silver. He at length considerably diluted his bath, and got rid of the trouble at once. There is another prolific cause of these stains when plates are long kept; but in this case the stain generally assumes the form of a slug track extending from the edge of the plate. This arises from the free nitrate on the plate coming into contact with some contamination in the inner frame, which spreads over a portion of the plate, producing the stain in question on the application of the developer. It is probable that in some cases the presence of a volatile impurity in the collodion, from which, combining with silver, a metallic scum may form on the film during the long keeping of the plate, may be the origin of similar markings. We have more than once found such stains arise readily with an old and somewhat decomposed collodion, giving an intense negative, which were absent under the same circumstances when another sample of collodion was employed. In all cases where long exposures are necessary, the use of a dilute bath, free from organic impurity, undecomposed collodion, and scrupulously clean inner frames, will best conduce to immunity from such stains.

Where long keeping of the plate is not the cause, we think that indicated by Dr. Anthony will be most frequently in operation, and, as pointed out in his communication, detection is easy and the remedy simple.

PHOTOGRAPHY AND PIRACY.

We call the attention of our readers to a communication, in another column, from Messrs. H. Graves and Co., on the subject of photographic piracy of engravings, and bespeak for it careful attention. We do this with the double motive of giving it as much prominence as the remarks of our own, which have called it forth, and of giving every possible weight to its denunciations against piracy. We are fully agreed as to the meanness and dishonesty of piracy, whether the injury it inflicted were much or little; and we denounce it with the more indignation when we learn that the extent of its evil effect on the engraving publishing trade is so injurious as to tend very seriously to suppress enterprize and injure the art of engraving. We should regret such a consummation, if it were the legitimate result of the march of progress. Much as we are interested in the successful extension of applications of photography, we cannot contemplate with any pleasure the coincident or consequent extinction or declension of an art so beautiful, and which has attained such a high state of perfection, as the art of engraving. But if, in addition to the legitimate competition of engraving in multiplying works of art, photography be used illegitimately to poach on the preserves of others; if, when others have invested thousands in translating colour into monochrome, it be rendered available to make a base and easy theft of the results of this investment, then we hold that every honest devotee of photography is concerned in using his influence in discountenancing at all times, and aiding in detecting, malpractices so degrading to his art.

Thus far we cordially agree with Messrs. Graves and Co. We furthermore rejoice in every success they have in prosecuting piracy, and hope that by a relentless imposition of the highest fines in every case of wilful disregard of copyright laws, fear may be made to suppress a practice which can only be put down, apparently, by dread of consequences. It is true that in their letter they to some extent justify some of our remarks, the truth of which they are scarcely willing to admit. They state that they have no dislike, jealously, or fear of photography; but they add, that they have a contempt for it when it is used for purposes of piracy. This is what we feared and deprecated. We can understand that such a feeling is not altogher unnatural, when suffering under the injuries sustained by photographic agency; but it is not altogether fair to feel contempt for the art because it has been misused by mean and dishonest men. We might as legitimately object to engraving, because it is an art occasionally used to forge bank notes or valuable documents.

On the nature of the property in copyright we are slightly at issue with Messrs. Graves and Co. We know that it has been for some time a moot point amongst lawyers whether copyright of any kind has, or ever had, an existence at common law, or was dependent wholly on the statute. We are disposed to hold that it had, and has, no such existence. The fact, as we have before observed, that the property conferred by the statute only exists for a limited period, is a strong argument in favour of this view. If an inherent or absolute property in copyright existed, which would be maintained at common law, a statute limiting the duration of that property would be an absolute injustice. Further, the preamble of the last Fine Art Copyright Act begins by stating distinctly that no such copyright exists. It says:—"Whereas by law, as now established, the authors of paintings, drawings, and photographs have no copyright in such their works." The common law right to such copyright has, we know, often been insisted on; but in one of the most recent and important trials of the question, Jefferys v. Boosey, it was decided by the House of Lords, on a writ of error from the Exchequer Chamber, that no copyright of any kind exists at common law. We are not now discussing the ethics of the question, but simply the state of the law as it stands, which it is as well should be clearly stated. No argument in favour of piracy can be drawn from the fact, inasmuch as the statute gives such copyright under definite conditions, and provides a short and simple remedy for its infraction. We constantly maintain in these pages, moreover, in answer to oft-recurring enquiries, that the safe and honourable rule for photographers is to regard all works of art as the property of some one, and not attempt to copy any picture without a full knowledge that its copyright has lapsed and become public property. Whilst we have pointed out that in some instances print publishers have, by their own neglect of the provisions of the law, and that at times for unfair purposes, laid themselves open to piracy, we have, nevertheless, insisted that it was dishonourable and dishonest to take advantage of unintentional informality to violate a copyright, and we have strongly deprecated such a use of photography.

Regarding the commercial question, Messrs. Graves and Co. and other publishers undoubtedly understand best how to manage their own business, and no one can, with propriety, intermeddle in the matter. We do not for a moment indorse any notion that the interest of art education amongst the poor or any other class can justify a violation of private property. Our suggestion was, that the issue of small photographic copies of pictures would act as advertisements to the engravings. Messrs. Graves and Co. believe that if they issued photographs at all, it would open a door for piracy, and make its detection more difficult than it is now. We think, on the contrary, that if they issued photographs never exceeding a certain size, and with a definite signature, monogram, or trade mark on each print, and gave the utmost publicity to the fact, the sale for pirated copies would be materially reduced, and the detection rendered more easy. As a rule, the public would prefer legitimate to pirated copies, and if they knew that they could purchase legal and copyright photographs, they would have little temptation to purchase copies which would have the stigma of illegality attached to them. Pirated copies would be easily detected as lacking the proper credentials of signature, &c., and any copy of these would of course be fraudulent. The very competition of a legal with an illegal copy would so reduce the profits of piracy as to render it not worth pursuing. The legitimate sale could be effected at a price which would compete with piracy, which, being illegal, must always be conducted with more trouble and cost than legitimate trade. In all this it must be understood, that we are referring to small photographs, and that we are making suggestions which we think are worth consideration, but which we have neither right nor the inclination to urge upon those disinclined to regard them.

In regard to large photographs, we are very willing to admit that their issue may interfere seriously with the sale of engravings. Piracy of this kind is most exasperating, and only to be put down by a rigid enforcement of the fullest penalties of the law wherever a case is detected. A letter just received by Messrs. Graves and Co. from a customer in Dublin informs them that in that city almost all their best works are to be had in the shape of large photographic piracies, a circumstance which was entirely ruining the trade in good engravings in that city. This is every way deplorable, and demands energetic remedy. In the majority of the cases of conviction hitherto the retailer of the photographic piracy only has been detected. There can be little doubt that the production of the piracies is carried on somewhere on a large scale. The discovery and prosecution of the producers would doubtless tend best to suppress piracy. If they are produced in this country, the detection must, we apprehend, come sooner or later. If, as we suspect, these large copies are of Continental produce, the matter may be more difficult; but in such case there is surely some neglect on the part of the Custom-house authorities.

In any case, we commend earnestly to the attention of all dealers in photographs, scraps, &c., the importance of securing for their trade some reputation for honest dealing, by declining to purchase or order anything to which the slightest possibility of piracy can attach. We believe that this branch of trade is one which must gradually increase with the inevitable progress of photographic reproduction: it is important, then, as a matter of trade policy, as well as honesty, that it should be free from the taint of piracy, which is simply another name for theft.

VARYING THE FOCUS DURING EXPOSURE.

In another column will be found a letter from Mr. Claudet on the controversy which has arisen on the subject of his paper read at the British Association. One of the most unfortunate phases connected with scientific progress is the unhappy tendency in many minds to decry or question the novelty or merit, or both, of everything new; a tendency which affords little encouragement to the scientific investigator to publish his ideas, the more so that public recognition, even when freely accorded, is often his only reward. In regard to the question of altering the focus of the lens during exposure, there appears little doubt that the idea had occurred to others before, and had an existence in various minds as a possible means of effecting a certain improvement. It is equally certain that the idea existed in a very dim and shadowy form, inasmuch as it was never brought to the touchstone of a public verdict. In Mr. Claudet's paper the idea is boldly enunciated, and the whole question very fully discussed, with the earnestness accorded to a new and important thought. The only result which can flow from it must be beneficial to photographers. Whether they adopt the method or not, they are wiser for its promulgation, and an important question has been brought home to their minds. To a man like Mr. Claudet, who has held an honourable position in relation to the science of photography since the days when the art was in its swaddling clothes, the *eclât* of introducing a novelty can be matter of little importance; a zeal for the interests of his favourite art can alone, so far as we can see, be a motive for his position.

We are glad to observe that he intends to bring the matter under the attention of the Photographic Society, where we hope it will receive a full and fair examination, and be discussed in the broad spirit of scientific enquiry, free from the pettiness of personality and jealousy. We commend Mr. Claudet's letter to attention for its remarks on the spirit which should pervade the polemics of science, and for its illustration of that spirit.

PHOTOGRAPHY AT THE PYRAMIDS.

Professor C. Piazzi Smyth has just issued a preliminary notice of the results of his recent measurements and scientific investigations conducted at the great Pyramid of Jeezeh, which takes the form of a pamphlet, said to be "anticipatory of a fuller publication." The account in question is the veritable address delivered before the President and Fellows of the Royal Society of Edinburgh, in April last, and forms part of the published transactions of that learned body.

The author's statement is, for the present, devoid of technicalities, the grand results obtained and conclusions established being framed in simple language, and briefly stated in the form of six propositions, which have in a remarkable manner confirmed the previous—one might almost say prophetic—deductions of the late Mr. John Taylor and himself, as described in Professor Smyth's interesting work, entitled, "Our Inheritance in the Great Pyramid." The matter is further illustrated by three well-executed lithographic plates, representing the vertical and horizontal sections of the great monument, besides other drawings to scale of certain parts of the interior, particularly of the so-called "King's" and "Queen's" chambers. In the Appendix are enumerated the specimens of minerals and antiquities brought home by the great astronomer, and deposited by him in the Royal Society's Museum, Edinburgh. Some fragments of the casing-stones have afforded valuable data with respect to the angle, or inclination, of the sloping sides of the Pyramid, and the composition of these and other minerals used in the construction has been made the subject of a special chemical study by Dr. William Wallace, of Glasgow.

During the four months of his stay in Egypt, Professor Smyth has succeeded in obtaining an important series of photographs, consisting of 166 single views and 57 stereograms. The results in themselves are of great interest and importance. It is not possible, within the limits of this notice, to do more than announce the bare facts certified to in the work before us. These are, firstly, that the base of the Great Pyramid is a *square*; secondly, that the figure is regular, inasmuch as the four sloping sides incline towards the central vertical axis at equal angles; thirdly, that this angle of elevation is 51° 51′; fourthly, that the sloping ascent of the Grand Gallery is expressed by 26° 17′ (measurements in both instances practically identical with those demanded by Mr. Taylor's theory); the fifth proposition establishes the geographical position of the Pyramid as being close upon the thirtieth degree of north latitude; and the sixth, the fact of the whole work being slightly displaced (tilted towards the south-east to the extent of about 37°) as the result of geological changes occurring subsequent to its erection (*i.e.*, within a period of about 4,000 years). The author further deduces, from his own accurate observations, the standards of size, weight, and temperature; and lays stress upon the employment, by the builders, of the Jewish cubit of twenty-five inches, which is exactly one ten millionth part of the earth's radius of rotation. The mysterious porphyry coffer is made to tell its tale of weight and capacity; and, lastly, the mean temperature of the interior of the Pyramid is ascertained to be 68° Fah.

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

Mr. Claudet's Suggestion—Mr. Woodbury's Process—Enlargements by Electric Light—The National Portrait Museum—Photography and the "British Quarterly Review"—Royal Cornwall Polytechnic Society—Photo-ceramic Ware—Photography in the Louvre—Cabinet Portraits.

One of the disadvantages of being known by a familiar name is the risk of having to bear the credit of the virtues, or the discredit of the vices, of a numerous family. John Smith, for instance, who left £1,000 to a benevolent institution, and John Smith who was convicted of mistaking some other person's name for his own, may easily be confounded with John Smith, dweller in a neat little villa at Camberwell, who was never convicted of a greater virtue than growing an enormous gooseberry, nor a worse crime than occasionally annoying his neighbour by persistent solos on the bassoon or the bass-viol. Now, although "Old Photographers" are not, perhaps, as scarce as the dodo, they are not as plentiful, especially in print, as blackberries in an autumn hedge-row. As the correspondent in a contemporary journal, writing upon Mr. Claudet's recent discovery, signs himself "An Old Photographer," and as I do not wish, whether he be right or wrong, to claim the credit or incur the responsibility of being answerable for his opinions, I take this opportunity of stating that, although I am "An Old Photographer," and write regularly under that name, I am not the author of the letter in question.

Touching the utility of this same proposal I expressed my opinion in the last "Echoes." I believe the object of the suggestion—it is scarcely a discovery or invention—to be entirely right, but I am less certain of the efficiency of the means which Mr. Claudet proposes. If there were no optical difficulties, the mechanical ones would be very great. To enable the lens to be moved backwards and forwards during exposure, the camera-stand would have to be made of great weight and steadiness—even the floors of many glass-rooms would have to be strengthened to prevent vibration; then the rack-and-pinion of the lens would have to be kept in perfect working condition—and photographers know how soon those even by the best makers get out of order. Another difficulty would be moving the lens through the appointed space during the time allowed for exposure, so as not to favour any one plane more than another. All these arguments point to the employment of a lens in which the optician has distributed the focus, such as Dallmeyer's new "Triple Group," and with the use of which all the complications are avoided, and the work—so far as I have been able to judge from examples—is at least as well done. If the suggestion, made in last week's News, of bringing the matter before the Society, be carried out, we may anticipate an interesting discussion. In any case, I join with those who thank Mr. Claudet for bringing prominently under public attention an important subject.

It has been suggested by two or three journals, in which no illustration of Mr. Woodbury's photo-relief process has appeared, that there must be something the matter with the invention, some hitch or fault over which the inventors could neither fly nor stumble. I have had certain evidence that this is not the case. During a recent visit to Manchester, I have seen the process in operation—the manufacture of photo-relief prints in quantity in full swing, and it was certainly one of the most interesting sights I saw in that town. It is not necessary here to go into a lengthened description of the process, the printing part of which is now well known to photographers. The production of the gelatine reliefs is very interesting, Wilde's electro-magnetic light being employed in the place of the sun. This electric light not only produces sharper relief than does sunlight, but it appears to be absolutely necessary in Manchester, for that town shares with Ireland the saying that "it always rains there," and I have never seen anything in either place to persuade me to the contrary. The room in which the light is produced reminds one of all the noise and "whir" of all the machinery departments of the last great Exhibition condensed into a small room. As well try to hold a conversation on board a steamer in a hurricane, as to speak with a chance of being heard in that room, when the electric apparatus is connected with the steam power which sets it in motion. The "light" is produced between two carbon points, round which are ranged the frames containing the negatives, through which are printing the prepared gelatine. The printing from the metal mould is conducted at another establishment, and is done entirely by what are technically termed girls, but who, I imagine from their appearance, would prefer to be called young ladies. I understand that orders are coming in fast—so fast, indeed, that Mr. Woodbury is now perfecting a machine which he expects will turn out thousands of prints where he now produces hundreds.

Wilde's electro-magnetic apparatus will be of use in many branches of photography, the cost of its production being limited to the first expense of the machine, and the small rental necessary for steam power. An enterprising firm in Manchester, Messrs. Saxon and Co., are now employing it for producing enlargements for the trade. The possession of a permanent light, night and day, enables them to guarantee the return of negative and print within twenty-four hours.

When in Manchester, I called upon Mr. McLachlan, and had a talk with him about his scheme for a National Photographic Portrait Museum. Two months ago I had occasion to fear that the progress of this design would be impeded by the adoption of carbon processes of doubtful excellence, which could not compare in beauty or rapidity of production with Mr. Swan's, for the production of the portraits to be preserved in the Manchester Museum. That danger seems past, and the process in question discarded. There is no doubt but that *a* carbon process must be employed for portraits that are to be transmitted to posterity, but why any other than Swan's, which has been already, and with no drawbacks that I know of, proved to be superlatively excellent, should be entertained, I have no idea.

One of the greatest impediments to this excellent scheme is the difficulty of getting photographers to fulfil their promises. When Mr. McLachlan last year brought his scheme prominently before the public, he had offers of assistance, in the form of the loan of negatives of great men, in abundance; but now the time comes when these negatives are required, they are found very difficult to obtain. This, I am sure, can only arise from want of attention in the photographers who have promised aid, as the honour of having impressions of their negatives printed by a permanent process, and preserved for all time, must be sufficient recompense for the most ambitious.

Much as has been written on photography, the history of the art-science had, a few months ago, to be given to the world. This has been at last done very completely in an admirable article in the *British Quarterly Review* just issued. The author, beginning at the time when the first glimmerings of the surprising power which was to be brought to the aid of all arts, all science, and all commerce began to dawn on the minds of the fathers of photography, follows up those facts, and describes those discoveries and inventions which go to form as wonderful a history of a wonderful science as that of the electric spark Franklin drew from the string of his kite, and which has culminated into the Atlantic cable. This article, whilst dealing comprehensively with the history, theory, practice, and applications of photography, both as art and science, has a charm of style which makes it read like a fairy tale; indeed, the history of photography properly written should be one of "the fairy tales of science," if the art itself is not one of the "long results of time." The *British Quarterly Review* for October, 1866, will be a standard reference, in future, on the progress of photography up to that date.

It is a subject for congratulation to all those interested in the art-progress of photography, and one in which I rejoice heartily, that Mr. O. G. Rejlander has taken the premier medal for the most artistic photograph at the Royal Cornwall Polytechnic Society's Exhibition, just closed, at Falmouth, a prize worth having, seeing that this Society has so distinguished itself, as a rule, by its judicious rewards. Few men have done so much to justify the art claims of photography as Mr. Rejlander, and notwithstanding a good deal of approval and recognition in the shape of talk, no man has so far fallen short of receiving his due meed of honour, as far as it is expressed by medals or honorary awards of real or supposed authority. The medal for the best landscape was awarded to Mr. Bedford. This was a matter of course. Mr. Bedford's landscapes are so uniformly excellent, that I believe he has never yet exhibited at a medal-giving Society without obtaining the highest award.

In one of the cases in the new Court of the South Kensington Museum is now exhibiting a beautiful specimen of ceramic ware, ornamented with photographs by Lafon de Camarsac. It consists of a cup and saucer of white French porcelain, on each of which is printed a portrait by M. Lafon's enamel process. The effect is very pleasing, and photographers will be especially struck with the beautiful depth and richness of the blacks, a quality which appears to be difficult to obtain in several processes of photo-enamelling.

French photographers have had to pay the penalty for slovenliness and carelessness in their operations. Formerly, all photographers well recommended were allowed to copy the paintings in the Louvre, but it has been found that so much damage was done to the floors and staircases by the droppings of silver and other solutions, that the permission is withdrawn. Thus those who have exercised due care and caution have to suffer for those who have abused a permission to copy the great works contained in this gallery, which must have been a great boon to photographers and artists alike.

The progress of the cabinet portrait movement goes bravely on. Opticians are making lenses; apparatus-makers, cameras; manufacturers, albums; all are contributing to push forward what must be the next great movement in photography. The London photographers are, as usual, behind their provincial brethren in bringing out the novelty, which, I feel convinced, is destined to rescue their business from the decline which some have feared would become chronic.

THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Further Remarks on the Latent Image—Contending Theories Reconciled, etc.

> "In experimental philosophy, we are to look upon propositions collected by general induction from phenomena, as accurate, or very nearly true, notwithstanding any contrary hypothesis that may be imagined, till such time as other phenomena occur, by which they may be made either more accurate, or liable to exceptions."

In the workings of an experimental science it generally happens that a certain amount of control over effect is acquired ere any firm advance has been made towards a satisfactory elucidation of causes; and it frequently occurs (when pecuniary advantages arise from the practice) that traders, allured by hopes of gain, rush in, who, so long as money is to be made, hold things as they found them, and remain content with the blind power they unsteadily possess, leaving to others, whose minds are differently constituted, the fascinating but unremunerative task of tracing out ruling principles. While watching the unselfish explorers thus engaged, it is at once interesting and instructive to note the many apparent discrepancies which turn up as we apply the test of comparison to individual experiences. Under this crucial examination, confirmation becomes direct contradiction, and the summing up yields a product of confusion. Yet, despite the difficulties encountered, the large-hearted pioneers patiently pursue their labours of love among hidden depths, while bewildered lookers-on shrug their shoulders derisively, or, like my Lord Burleigh, shake their heads sagaciously, as the seeming advantage shifts from one side to the other. But by-and-bye derision gives place to astonishment, and wagging heads find voice to exclaim, "Who would have thought it?" when discoveries, apparently antagonistic, are dovetailed together, thus forming in the aggregate one grand total which constitutes one more triumph of mind over matter.

Bringing these prefatory remarks to bear on the subject to be considered in the present paper, I direct attention to the apparent antagonism which is observed in the two theories that endeavour to clear up the mysteries attached to the latent image—each in their turn receiving such incontrovertible support from ingeniously-devised experiments, that an unbiassed observer is compelled to hold his judgment in a balance, and ask for "more light."

After a careful study of the subject in all its bearings, and having also weighed over well each proof offered in support of the contending theories, I have arrived at a conclusion that the time has at length arrived when chemical and physical theorists might join hands amicably, and pronounce the results of their labours to be links forged to form one continuous chain of more than probabilities.

The first link in the chain is undoubtedly the admirable theory of electro-polarization, as advanced by Mr. Nelson K. Cherrill, which (as it will be remembered) teaches that an atom of iodide of silver, when exposed to actinic light for a brief time, becomes polarized, and, in that state, is capable of attracting to itself particles of silver set at liberty by the deoxidizing developer.

The numerous experiments undertaken by M. Carey Lea go very far to support the position held by Mr. Cherrill; indeed, so powerful are the arguments offered by the first-named gentleman, that it would seem an absurdity to hold longer to the doctrine of chemical action, had we not received arguments equally strong to support this side of the question—most potent of which has been recently provided by M. Poitevin, who has clearly proved that a continued application of light is capable of liberating iodine from its base.

Perplexing as the subject is thus made to appear, but little ingenuity need be exercised in making both sides meet, if we commence at the end provided by Mr. Cherrill.

The phenomenon of electro-polarization has long been familiar to practical chemists, who have discovered that results arrived at by an application of electric currents to chemical compounds might, in many instances, be imitated by substituting the solar rays in lieu of electricity.

It is believed (and experiment supports the supposition) that the first action performed by an electric current on a chemical compound is to produce polarization; or, in other words, to concentrate the two substances of which the atom is composed, at two points, the one pointing towards the positive pole, the other the negative. Now mark what follows. The continuous strain applied by the electric current separates the substances, which, theoretically, pass from atom to atom, until they are finally liberated at their respective poles. Apply these remarks to the subject in hand, and soon physical and chemical theories become one.

Mr. Cherrill has struck the key-note. The action of light polarizes an atom of iodide of silver in a brief space of time. So far the results might be considered as physical. Prolong the exposure to light, and iodine is liberated, if any substance is present to receive it. "Ah!" say you, my reader, "M. Carey Lea has shown that no possible escape of iodine could have occurred in his experiment." True; but remember the gentleman named took great pains to eradicate every trace of every substance which is capable of receiving it; consequently electro-polarization occurred, and the action stayed. "All very good," say you, my reader; "but M. Carey Lea produced an image by simple pressure." Very likely he did, I reply; but remember, it was comparatively a heavy pressure which brought the free nitrate and iodide of silver into close contact. Consider that in Nature there are many invisible forces operate. Is it not possible that simple pressure, under the conditions described, would impart to the iodide salt a mild magnetic property? If so, the reduction of silver would first take place on the excited portions of the plate. Or again, the atoms of nitrate (without considering any unusual phenomenon) would, when brought into closer contact by pressure, be the first to succumb to the deoxidizing agent. But to take the next stage.

M. Poitevin has shown that a latent image might be produced on a silvered plate which is in itself free from iodine until it receives it from another plate, when, in close contact, the two are exposed to the solar rays. I regret much that the experimentalist has remained silent on the question of exposure, and my own time at present is too fully occupied to examine the matter for myself; but I am inclined to believe the exposure was not a short one. Long or short, however, iodine was liberated by the second stage of electric action being arrived at. In short, as a brief summing up of the whole, I believe the latent image, as usually produced, is the result of electro-applied power as exercised by light, and, so far, might be regarded as the physical treading close on the heels of the chemical, as a continued exercise of the same power ultimately brings about a chemical decomposition.

In my concluding (and according to my usual custom) practical remarks, I would here observe, doubtless there are many readers of the News who slur over such subjects as theories, regarding them as a waste of space, and a making much ado about nothing. Stay, courteous reader; bear with me a little, while I endeavour to show you that theories, so far as the latent image is concerned, are not so silly a subject as you fancy, for they have reached a stage which would provide a profitable field for experiment in a practical direction; and I only regret my inability at present to join in the pursuit. Photographers of taste are sighing for a more sensitive compound to catch the fleeting lights and shades which at certain times transform yon landscape into "fairy land."

Ripened theories seem to me to point the way to reach the object desired. "Process-mongers," with their magic developers, form not the way. A developer might be so constructed as to precipitate, with extra rapidity, the silver which forms the superstructure; but except the latent image is sufficiently formed, your active developer only hastens fogging. Witness an entirely under-exposed plate with the best of developers. I repeat, the only direction to seek additional sensitiveness is towards the latent image; produce the latent image perfect, no matter how quickly. Your present developing form will serve your purpose. And now to suggest the most reasonable course to commence experiment on.

Long experience has shown that a neutral silver bath produces the most sensitive plate when the collodion is in proper condition. Now, it is necessary to examine whether this is owing to the latent image being more quickly formed, or to the additional facility offered for development. I believe it will be found that a neutral bath is the most favourable in use for producing a latent image quickly. If so, might not a decidedly alkaline bath (made so with oxide of silver) work more rapidly still? Analogy says yes; for alkaline substances (at all events as applied to photography) are the readiest to decompose: witness the fogging which follows the use of an alkaline bath such as I have described. The latent image is present in spite of fogging, which is veiled by reason of the too rapid reduction of the unstable, because alkaline, free nitrate, which precipitates simultaneously, under the influence of the developer. A slightly acid or strictly neutral solution, does not behave so. Take the hint. When extreme rapidity is required, I believe it might be obtained by sensitizing in an alkaline bath; the plate washed over with distilled water, after exposure, and then redipped in a slightly acid bath before development. Try it, my readers, if you are blessed with means and time for experiment, and when you have tried it, whether you succeed or fail, make known the results to my humble self, who am not so favoured. My next will treat on practical matters suggested by an extensive correspondence with "despairing ones."

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

Photographic Department.

The Royal Cornwall Polytechnic Society, which has just concluded its annual exhibition, always does honour to photography by its liberal and discriminating award of medals, as the following list will attest. "Honourable mention" is, if we remember rightly, a new form of award with this Society, and extends the list of honours bestowed. The silver medal for the best portrait does not appear to have been awarded this year. The following is the list of awards.

O. G. Rejlander, London—Silver Medal, Premier Prize for the most Artistic Picture exhibited.
Francis Bedford, London—Silver Medal, Best Landscape.
Dr. Wallich, London—First Bronze Medal.
G. Wardley, Manchester—First Bronze Medal.
Bullock Brothers, Leamington—First Bronze Medal.
W. May, Devonport—First Bronze Medal.
J. C. Stephens, Falmouth—First Bronze Medal, for Cartes de Visite.
W. Gillard, London—Honourable Mention.
H. Hayman, Launceston—Honourable Mention.
S. Thompson, London—Honourable Mention.

The exhibition of photographs this year was exceedingly prolific in gems from the studios of some of the principal photographers in England. In extent as well as in character the collection far exceeded anything that has been seen at the meetings of the Society in previous years; and where there was so much excellence some difficulty is experienced in making a selection of particular productions for special notice, it being certain that some, of unquestioned merit as works of art, must be overlooked.

Amongst the illustrations of novel processes, W. H. Smith exhibited a variety of pictures and scenes by his patent Gelatino-Chloride of Silver process, including portraits on pot metal, opal glass, designs on gold grounds, on ground glass for lanthorns, and landscapes on wood, &c., for hand-screens, which latter had a very pretty effect, and indicate an extension of the art into a new field. Bullock Brothers, of Leamington, contributed several specimens of their litho-photographs untouched by hand, which evince a marked improvement as compared with their earlier specimens, an example of which was issued with the Photographic News a few months since. The same firm contributed two composition pictures, one a representation of the appearance of the Angel Gabriel to the Shepherds on the night previous to the birth of Christ, and the other entitled "Nearing Home," both of which have before been noticed in these pages.

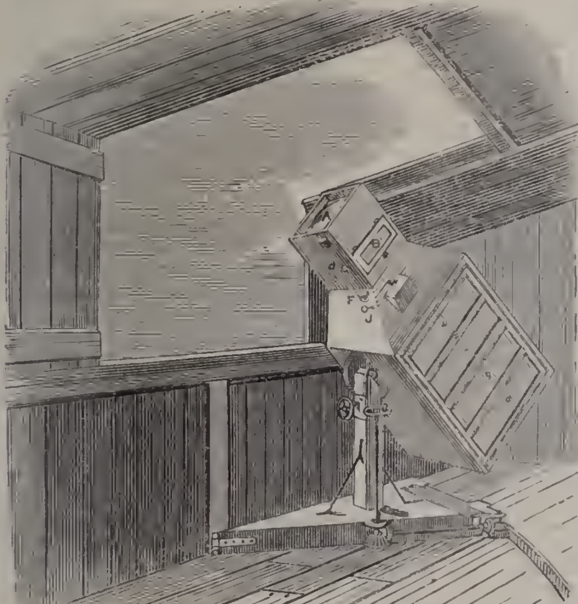
A portfolio of nearly a hundred photographs by O. G. Rejlander (for the first time an exhibitor) attracted the most interest and attention in the department. Its contents would form a noble exhibition in themselves: apart from their beauty as photographs, they display an amount of technical knowledge of anatomy and of artistic skill rarely found amongst the brethren of the camera. Francis Bedford, who also exhibits here for the first time, was represented by some excellent peeps of beauty in English, Welsh, and Scotch scenery, and Egyptian views; their effect, clearness, and finish are unrivalled. George Wardley, of Manchester, sent a most excellent collection, in which there is generally a minute rendering of detail, accompanied with a most judicious attention to lighting; the smaller scenes were peculiarly effective and beautiful. Stephen Thompson was well represented, and his productions seemed to be much admired, especially some small Swiss views, which have a peculiar Turneresque effect. His architectural views of the grand old churches and cathedrals of Normandy and Belgium were very fine and valuable as aids to art.

One of the prettiest frames in the department was that showing the new style of double portraits, exhibited by W. Gillard, of London; this is a novel style, and one we think likely to become popular, as two faces set similarly to those in a duplex medallion look effective, and have their advantages. Henry Hayman, of Launceston, exhibited some effective views of the north coast of Cornwall and Devonshire, while May, of Devonport, illustrated the south and west, many of his pictures being especially interesting to geologists. Messrs. Freeman, of the Carnsew and Cheesewring Granite Quarries, exhibited an interesting series of views, representing the raising of the granite monument to the late Duke of Wellington, at Strathfieldsaye, the pedestal and column being formed of stone wrought from quarries in the neighbourhood of Falmouth. As a work of photographic art the series was interesting, but as a means of retaining a proper reference of appliances used for raising this extensive monument, they are possessed of a great and future value. Dr. Wallich, of Trevor House, Warwick Gardens, was also an exhibitor of some most effective vignettes, a series of portraits of the same lady. Some Irish views, by Mr. J. M. Browning, of Dublin, claimed great attention, more particularly a charming bit, "Tore Lake, Killarney, Evening;" and last, though not least, Mr. J. C. Stephens, Falmouth, the energetic curator of the exhibition, contributed two frames of vignette cartes-de-visite, which were remarkable for their clearness and delicacy of finish. Photographic exhibitors generally will be rejoiced to note the prize awarded to this gentleman, for whilst few may know the excellence of his pictures, very many are familiar with his uniform courtesy and attention to the interests of photographers in the arrangements of the exhibition.

A NEW DESIGN FOR A SOLAR CAMERA.

BY J. CARBUTT.*

As the method of producing large photographs by the aid of the solar camera is becoming more and more in vogue, both in this country and in Europe, I venture to send you a description and drawing of one I have designed and built, together with the room it occupies, to suit my own special wants. Before proceeding with its description, I would say, that after a lengthened trial in making portraits up to 16 by 20, both by negatives taken that size *in* the camera, and from small negatives by the solar camera, I was convinced that, with careful manipulation in producing the right kind of solar negatives, pictures by the latter instrument could be made fully equal to those made from contact negatives; and the only drawback *I* found was the necessary aid of King Sol when you want him, and a direct, or other solar printing camera, in which the mechanical working parts work sufficiently accurate to enable you to obtain the desired results in the photograph. At that time (1863), the only direct printing solar camera to be had was Shive's; and after a trial of it I did not consider it perfect enough in its parts for the purpose desired. Just then (November, 1863) there appeared in the columns of the Photographic News a description of a solar camera by J. Stuart, of Glasgow, which, by uniting the room with the solar cemera, struck me as being very practicable, and my first model was constructed on his plan; but owing to the exposed position of the roof of the building on which I intended to erect it, and fearing in winter it would be rendered useless by the base becoming clogged up with ice and snow, I abandoned that plan, and, after various modifications, adopted the following, which, after six months' trial, has proved to be all I could desire.



The room in which the camera is kept and worked stands east and west, and is 18 feet long by 13 feet wide, 9 feet high on the north side, with roof sloping down to 7 feet on the south side. In the roof is an opening 6 feet square, provided with a light wooden shutter, sliding in grooves, and raised to the position seen in the drawing by a cord passing over a pulley, made fast at the north side of the room. An opening, 3 by 6 feet, is made on the south side for use during the winter months, and provided with sliding shutters. The drawing represents the same open, and the camera in position for printing. In the solar cameras of Shive and Roettger, the centre of motion is under the body of the camera, necessitating a wide open space to work the instrument. In this, it will be seen that, when the camera is brought to a horizontal position, the centre of motion from east to west is under the condensing lens, enabling the lens to receive the light and follow the course of the sun from nine to three o'clock, in a space the square of the length of the camera, which is 6 feet 6 inches over all. The body of the camera is made in panels, well framed together on a bottom of 1½-inch boards. Its interior dimensions are 26 by 32 inches, by 5 feet, and the front portion, holding lens, &c., 18 inches. A is the condensing lens; B the door to admit the frame holding the negative; C is a small door through which to inspect the progress of printing; D D D D doors opening to admit the printing-board, which slides in grooves placed at the top and bottom of the camera; E is a piece of metal, with small holes, through which a pencil of light falls on the projection, F, as a guide to keep the sun on the centre of the lens; G is the focussing screw; H is the binding screw; and J is attached to a wooden armature, carrying a light frame covered with tissue-paper, which, by pulling the wire, is brought down in front of the enlarging lens, to allow of the print being examined, and drawn back by a strong elastic ring. K is a section of about three-fourths of a circle of 12 inches in diameter, having on its edge a flat piece, 5 by 12 inches, cast in one piece, with holes for bolts to attach it to the body of the camera. Its centre is square, for an axle resting in the journal, L, one side of which tends downward, at an angle of seventy degrees. The edge of K is cogged, to work in the endless screw, M, by which the camera is kept to the sun's elevation. The post on which it is supported is 5½ inches square, mortised into a 2-inch plank attached to the triangle frame of 2 by 3-inch stuff. The post being further supported by iron braces, the point of the triangle base has a hinge-like coupling to the post in the side of the room. N is the rod connecting the bevelled cog-wheels, by turning which the camera is moved from east to west, and *vice versâ*.

Screwed fast to the floor is a circular iron track, having its upper edge half round, and cogged inside. The point of the triangle base forms the centre of the circle. At the broad end of the base is attached two grooved-edge wheels, and resting on the track, allowing a free and steady motion to the camera. The condensing lens is thirteen inches diameter, and sixteen inches focal length. The arrangement of this and the enlarging lenses (both made to order by Herman Roettger, Philadelphia) enables me to make a life-size head from a one-inch head negative, within a distance of 5 feet from the enlarging lens.

The room, also, makes an excellent one for copying in, being able to get the sun on a copy at any hour of the day. The north side of the room is arranged for stereoscopic printing in diffused light, and the prints so printed are far superior. In case prints on canvas or paper, by development, are wanted, the room can be entirely closed from white light, and yellow light admitted with but a moment's delay

Chicago, September, 1866.

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REMARKS UPON THE ACTION OF CYANIDE OF POTASSIUM ON PHOTOGRAPHIC IMPRESSIONS.

BY M. CAREY LEA.*

In a paper recently published, I gave the results of an examination upon the existence of silver in the whites of albumen prints. I propose to add thereto some observations upon the influence of cyanide.

If a paper positive, printed and toned in the usual way, be plunged into a dilute solution of cyanide of potassium, and be hereafter washed and dried, sulphydrate of ammonia, applied in a thin streak upon the whites with the aid of a clean new quill pen, exhibits the remarkable fact that the silver has been wholly removed.

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* We have to acknowledge the courtesy of an early proof of Mr. Carbutt's article from the Editor of the *Philadelphia Photographer*.

* *Philadelphia Photographer.*

It is greatly to be regretted that the picture is at the same time materially weakened. It is true that, by over-printing, a positive print may be made, able to bear the action of a weak solution of cyanide without serious injury, and that method has been recommended as a means of bringing down the strength of prints which have been accidentally over-printed; but still it would scarcely be allowable to use so powerful an agent habitually.

There is something well worthy of attention in the action of cyanide of potassium. When used upon a negative, it clears it away, reducing its strength a little, but affecting the delicacy of detail so little, that some firstrate photographers have been willing to employ it habitually. But when used on paper prints, the effect is very powerful, and with strong solution a print may easily be entirely effaced.

The reason of this is not altogether easy to explain. The negative consists chiefly of metallic silver. The print contains metallic silver, metallic gold, and an organic compound of silver. All of these three substances are soluble in aqueous solution of cyanide of potassium. If metallic gold only were soluble, and metallic silver insoluble, it would furnish a ready explanation; but this is not the case. We are thus led to conclude that the peculiar weakness of paper prints in respect to resistance to the action of cyanide depends upon the organic compound to which they owe much of their strength.

Another reason for the non-resistance of paper prints probably lies in the greater division of the metallic particles of which they are composed. All substances, when finely divided, are more easily brought into solution, and a proof of that fact in the present case may be found in an observation made by Mr. Dawson, that when organic developers are used, negatives are more weakened by fixing with cyanide. Girard has shown that, in the case of organic development, the silver is precipitated in much finer particles than when an iron developer, pure and simple, is applied.

The fact that silver may be removed from the whites of albumen prints by cyanide of potassium cannot be without interest to photography. It may be found that albumen prints on opal glass are susceptible of being fixed by cyanide of potassium; and if so, they would undoubtedly give a promise of greater permanence than when fixed by hyposulphite. Still, unless experience should show a very decided and well-marked superiority, resulting from the application of cyanide, its use must be condemned on hygienic grounds.

Correspondence.

PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Sir,—Our name having been so prominently brought before your readers of late, a few remarks in addition to those advanced in our reply to the *Daily Telegraph* article may not be altogether unacceptable.

In the first place, it must be clearly borne in mind that we are not photographic publishers, but fine-art print-publishers; we have no wish to interfere with publishers of photographs, and if we are content to restrict ourselves to our own business, all we ask is that we shall be left alone to conduct our own business in our own way, and that we may not be openly and unceremoniously robbed and plundered of that property which we have so dearly purchased and paid for.

In defence of photographic piracy, it was at one time urged (whether rightly or wrongly it is not our present purpose to enquire) that we had in several instances failed to comply with certain at least doubtful conditions of the old Engravings' Acts; but now that we take care to carry out with the most scrupulous exactness the fancied requirements of these Acts, the poor man's wants are suddenly held up as a reasonable excuse for infringing, in the most bare-faced manner, our undisputed rights.

We fail to comprehend why the few subjects published as engravings by ourselves and others should be the precise ones to be picked out for the art education of the people, unless it be that pirates find it much cheaper to copy, at their leisure, fine engravings, produced at great cost and risk, photographs from which *do* sell, and without which these could not be produced, than to publish for themselves photographs from their own designs, which *may not* sell.

However, the very able letter of your correspondent, Mr. Davey, whose opinions we most cordially endorse, and the observations thrown out by yourself, entirely obviate the necessity of our holding out any arguments in defence of our opposition to the system of wholesale piracy by photography. The question then resolves itself into one of expediency, as to whether it be advisable to publish photographic reproductions of our own engravings. Now, in this particular, we cannot accept the advice tendered, possibly disinterestedly, but decidedly from a photographic point of view.

Your observations may be considered as based upon theoretical conclusions in the interest of photography, whereas we reply from practical experience as publishers of engravings. We know for a fact, that the injury done to our general business by the indiscriminate circulation of these large-sized photographs, immediately on publication of a new engraving, is immense, and cannot be estimated. Where, formerly, in many a country town, a moderate return might with confidence be looked forward to yearly, now scarcely a single copy of an engraving is sold in the course of a whole year. To this fact our books and business letters abundantly testify. To publish large-sized photographs ourselves would be most suicidal, unless, indeed, we are prepared to give up engraving and take to photography. It may, perhaps, be questionable whether the issue of carte-de-visite, or scrap photographs, would be productive of so much harm, but even the publication of these is a matter requiring very grave consideration, and cannot be lightly entertained. Let us first clear the atmosphere of the present evil influences, exerted at all points, and, this done, we may be in a better position to consider calmly what arrangement may best be made for the general good.

We do not think that we deserve to be held up to the world as doing something very wrong, and as withholding from the public anything that they have a right to expect, simply because our ideas of things do not happen to coincide with the views held by some photographers.

Assuming copyright in works of the fine arts to be analogous to copyright in books and literature, the introductory remarks in your article of the 7th inst. may best be answered by referring your readers to the Journal of the Society of Arts—the number for January 19, 1866—wherein is contained the report of a lecture delivered by G. M. Hastings, Esq., LL.D., on Copyright. The position which copyright holds is defended by this gentleman with great precision. He points out that there are arguments in favour of the maintenance of copyright which would remain intact, even if the reasons advanced for the abolition of patents were adopted by the Legislature, and that copyright does not, like patent, operate as a monopoly. He asserts that ancient common law was in perpetuity—a fact, he states, abundantly confirmed by accumulated evidence; but that the common law right was subject to the grave inconvenience, that it could only be enforced by an action for damages; and as those who pirated works were generally men of straw, the remedy was, in fact, nugatory; and that it was on this consideration that the statute of Anne, the foundation of the present copyright law, was enacted; and, further, that the present statute may be regarded as an equitable compromise, *granting protection, readily enforcible, to the author and his representatives for a long term of years, on condition that the property finally revert to the public.* He concludes by expressing a hope that, by the aid of those who understand the question in its political and legal aspects, a measure may be framed which will give adequate security to the productive industry of the country, and greatly diminish, if it cannot extirpate, the immorality, so disgracefully prevalent, which acknowledges, and even boasts, of frauds as dishonest as the theft of a purse from the pocket.

We are not jealous of photography; we are not fearful of it; our dislike to it is not so great but that we can condescend to make it applicable to our own use for many purposes; but we certainly do hold it in contempt, and shall continue to do so, so long as it persists in appropriating to itself property justly our own. Let photography be honest and have a care for the rights of others, and we may yet learn to respect it as a sister art, although it can never hope to aspire (whatever other future may be in store for it) to that originality which both painting and engraving possess *per se*. We should be glad to see photography fairly compete with engraving, and with this intent we threw out the suggestion of a public company to be formed for the express purpose of disseminating respectable photography, as distinct from piratical photography. Some such an idea we heartily desire to see efficiently carried out, for, possibly, then "the meanness and dishonesty of piracy" might be successfully opposed without the necessity of the beautiful and noble art of engraving falling into disuse, and of its being entirely superseded and eclipsed by photography. Let it be once clearly understood that there is room for both in the "wide, wide world," and matters may yet be amicably arranged, so that each may enjoy its own without let or hindrance.

You state that in France photography is already recognized as a means of reproducing original paintings. Granted. And why? Because in that country engraving is efficiently protected, and photography, not being permitted to pirate indiscriminately, is enabled to develop its own resources, and, happily, with a successful result.

We incline to the opinion expressed by a contemporary of your own, that the multiplication of engravings on a smaller scale by photography would, as the law now stands, but open a still wider door to the operations of photographic pirates. Even photographers cannot protect themselves, and how can we expect to be protected? If we decline to publish photographs at all, we know for certain that all photographs of our copyright publications are piracies; whereas, were we to issue any, we might often ourselves be in doubt, to say nothing of the public, who can scarcely be supposed to carry in their memory little niceties of distinction between original photographs and pirated photographs, and in every instance to be circumspect in purchasing.

In conclusion, we would ask you to give publicity to this suggestion, that dealers in photographic scraps, both in London and in the country, should be careful only to buy of such respectable houses as they can implicitly trust, and not of hawkers having no ostensible residence; and, also, that they should take an indemnity from such houses that no copies supplied are piracies of copyright engravings. By adopting this course of action, possibly a more healthy state of things may be the result—a consummation devoutly to be wished.

Soliciting your kind indulgence on account of the length of this communication, which the desire to make our meaning clearly and explicitly understood has rendered to a great extent unavoidable, we remain, sir, yours very respectfully, Henry Graves & Co.

London, 6, Pall Mall, October 1st, 1866.

MR. CLAUDET'S DISCOVERY.

Sir,—It is no sinecure, indeed, to undertake the task of endeavouring to introduce improvements in art, or to add new facts to science. As soon as one has published the result of long experiments and difficult researches, he is called upon, in order to uphold the merit due to his labours and the originality of his discovery, to enter into an endless, and too often unpleasant, correspondence, to defend himself against all sorts of unexpected imputations, calling in question the fairness of his motives. He is fortunate when he has only to answer to questions put in a real spirit of justice, for the sake of historical records and with the view only of establishing their truth, without any attempt to provoke rancorous feelings. I am happy to make this remark in reference to the letter signed "Justitia" in your last number, and to the editorial note which follows it.

When a correspondent, in a style of good breeding, uses only a polite course of polemic, he may well assume an anonymous character; and in the present instance it could not have been possible to take a name more appropriate to the open and frank purpose of the writer.

"Justitia" has called attention to "a remark reported in your last volume, page 284, made at a meeting of the Photographic Society, by Mr. Jabez Hughes, on the occasion of a discussion respecting Mr. Pettit's system of photography, in which Mr. Jabez Hughes referred to a favourite idea, at one time, of the Rev. J. B. Read, for getting depth and definition by moving the lens with the rack-and-pinion during the time of exposure, so as to get alternately every plane, from the tip of the nose to the ears, in the best focus."

This proves evidently that among those who very naturally, in their daily practice, had paid attention to the optical part of photography, many must have had the same idea from the beginning. The Rev. J. B. Read not only had the idea, but, it would appear, had employed a long time ago the means of moving the lens for producing the effect; not very successfully, I would apprehend, or else many persons would have seen the result.

If I had known this fact, while I was experimenting and writing my paper, I would not have failed to mention it; and this acknowledgment on my part, instead of detracting from the interest of my paper, and diminishing its merit, would have added considerably to the value of its object and conclusions. The object of my paper was to further the progress of photography, and introduce in its manipulation a means which, if it had been thought of, and even tried, by the Rev. J. B. Read or others, was entirely unknown or forgotten—at least, was not appreciated by any photographers of note. At all events, it has never been practised in the production of portraits, or else portraits taken by that means would have been exhibited in various photographic establishments, and particularly at some photographic public exhibitions; and every one would have necessarily noticed them, for the style of the two modes is so different, that one cannot be taken for another.

My paper at the meeting of the British Association at Nottingham, after having fully explained the object and advantages of the method I proposed in order to produce harmonious and artistic portraits, was followed by the exhibition of specimens successfully accomplished by the process described; showing that it was a great improvement, a fact which had not been proved and admitted before: therefore my paper had the merit of that kind of novelty, and a real character of usefulness. If photographers adopt the system, no one can say that it will be owing to what has been stated very cursorily of the Rev. J. B. Read's or other obscure attempts, and without the least stress, only for the purpose of combating the strange illusions of Mr. Pettit respecting the production of the stereoscopic effect by the superposition on the same picture of several images of different perspectives; but it cannot but be acknowledged that it will have been decidedly on account of my paper, which has taught them the value of what they had rejected or forgotten; in fact, what they did not know; viz., that it was desirable and possible to equalize the defininition of the various planes of a solid in a photographic representation, and, by that means, to obtain the great advantage of producing an harmonious and artistic effect in photographic portraiture, As I myself remarked in my paper, in speaking of the means, "such an idea may appear impracticable, possibly, even, absurd; and it is sure, on first thoughts, to be rejected and condemned." So I considered it myself before I had fully examined and understood the whole question, and so it has been by all those who have happened to glance at such short and incomplete announcements when they appeared in some parts of the papers, mixed with other matters of more absorbing importance. Therefore, before my paper was published, the idea could not but be considered as an absurdity, because it had not been fully investigated and sufficiently understood; and this accounts for its not having anywhere yet been brought into practice.

I do not wish to have more credit than I deserve in this matter; and if, as I said in my paper, which I boldly maintain, "this is to be one of the greatest improvements which has been introduced into photography since its beginning," I will leave to the photographic world to decide what share in its discovery or in its publication is to be granted to me for the investigation and experiments which have brought conviction to my mind—and, I trust, will bring conviction to the minds of others—and what share belongs to others (and particularly to the Rev. J. B. Read) for their forgotten and imperfect attempts in the same direction.

The suggestion made by "Justitia," that I should bring the subject forward for discussion at an early meeting of the Photographic Society, stating my further experiments, and showing my results, I am very glad to say is precisely what I intended to do, and I am preparing myself for this purpose. I hope I shall find at the meeting which will be devoted to my communication only persons honourably and exclusively actuated by the wish of furthering the progress of photography, and disposed to consider me not as an adventurous schemer or as a plagiarist, but as a man, the greatest part of whose life has been enthusiastically devoted to study and understand the principles of the beautiful art of photography, and to contribute as much as he was capable to its improvement.

I expect that a numerous class of photographers will not approve the plan I propose, calling it "an illegitimate dodge and a heresy;" that many will prefer to obtain portraits in which every hair and every rugosity of the skin will be sharply defined by small apertures in their lenses. I shall not try to change their conviction, particularly as I am persuaded that they will please a great number of persons, who precisely appreciate photography only on account of the microscopic definition of its productions. That class of photographers will excel in views or landscapes, in the reproduction of pictures, engravings, and other objects of art in which the definition cannot be too great, and in which there is only one plane to represent. But I am sure I shall meet also with an equally, and, I dare to hope, more numerous class, who will find that art is the greatest enemy to definition when the object is to execute portraits, and who will be glad to produce rather harmonious than sharp likenesses. In portraiture, it is more important to be an artist than too exact a photographer. But both have, decidedly, their particular and legitimate merit, and I have no wish that one should supersede entirely the other. It may be well that there should be two schools in photography, and that it should have, also, its pre Raphaelists. All tastes must be satisfied.—I am, sir, yours truly,

A. Claudet.

AN ADJUSTMENT FOR THE FOCUSSING SCREEN.

Sir,—Should you consider this communication of any interest to your readers, it is at your service; if not, you will doubtless be able to find room for it in the waste-paper basket.

Take the ground glass out of its frame, A, and cut away the rebate, so that the glass can pass freely through the frame. Now screw two pieces of wood across the frame, top and bottom. Cut off the corners of the ground glass (see dotted lines, fig. 1); insert two thumb-screws, E, in each of the strips, C; lay the glass upon the points of the thumb-screws. Take two strips of wood, D; insert two screws, F, in each, and place them upon the ground glass. The corners of the glass being cut away will allow the screws, F, to be screwed into C. H is a strip of wood placed between the points of the thumb-screws, E, and the glass, to prevent breakage.

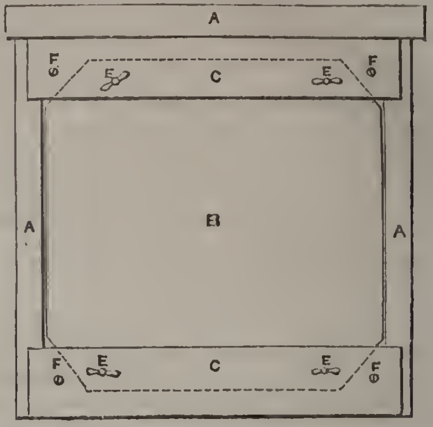

FIG. 1.

The ground glass is now held firmly by two sets of screws; by easing one set and tightening the other, it can be moved into the desired plane with the greatest facility.

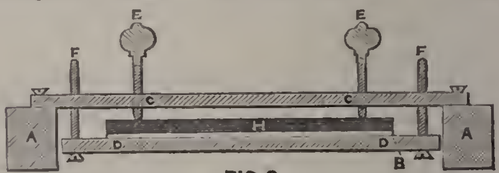

FIG. 2.

Springs might be substituted for the screws F, but I think that in some cases the pressure might prove too much for the glass. If made for the purpose, the points of the screws, F, would be flattened out, forming a handle for the thumb and finger to grasp, thus enabling the operator to adjust the glass without taking it out of the camera.

To adjust the glass.—Expose a plate, and ascertain which is the sharpest object. Now slide the ground glass into its place, and, without disturbing camera, lens, or object photographed, adjust the screws till the same object is equally sharp upon the glass as upon the collodion film.

I imagine this adjustment may be useful for telescopic and microscopic work, and perhaps may render the visual and chemical correction of photographic lenses unnecessary; though that is a question I am not sufficiently up in optics to decide.—Yours respectfully,

R. A.

Torquay.

LOCAL FOGGING.

Sir,—On reading over the remarks of your talented American correspondent, Mr. Carey Lea, on the varieties of fogging under the influence of developers, there is one of frequent occurrence, viz., the fifth form, whose nature, so far as my own experience goes, is wholly misunderstood. Mr. Lea correctly describes it as "not general, but local; irregular figures are formed, somewhat resembling the figures on marbled paper;" going on to say, "these figures are always more metallic in appearance than the rest of the surface."

This form of fogging both Mr. Lea and Prof. Towler seem to look upon as resulting from "the use of a developer stronger than the actual condition of the plate would bear;" or, in other words, that the fault results from the use of strong developers. I differ entirely from this opinion, and I hope I shall be able to show good grounds for doing so. In the first place, I think most photographers are agreed that the use of a strong developer is apt to cause markings and fog, but not of the kind in question; while I have found that when the bath is in a peculiar condition, the weakest reducing agent will cause these metallic marblings to make their appearance.

In order to make this communication as useful as possible, and instead of trying to upset Mr. Lea's hypothesis by an analysis of the reasoning with respect to the abnormal action of the developer, I will narrate a series of facts and experiments, extending over many years, by which I determined the nature of these local reductions of silver, and by which I was enabled *to get rid of them entirely.* To proceed, then:—During the thousands of experiments I made, during the early days of photography, with the view of improving the "positive process on glass," or "Ambrotypes," as I believe our American cousins call them, I observed that when the bath had been used a number of times—and particularly when we had set it in hot water, or "cooked it," to get rid of the accumulation of alcohol and ether—these patches of reduced silver were apt to make their appearance with great brilliancy, under the influence of the developers we then used, and which were of a nature to rather invite the reduction of silver to the metallic form. Now, baths, in those days, were supposed to be the sport of all sorts of demoniac influences, and this demon of the spots seemed to hold his own under all changes of developer. It was most mysterious!—but one day I found the key to all this; and, like most mysteries when solved, it was a very simple affair. At a time when this local reduction got so bad as to marble nearly one-half of my plate, it occurred to me to hold my bath edgeways towards the light, and to look along the surface of the fluid. I at once saw that on this surface there was an oily-looking film, very much like what the paper-stainer prepares to marble his paper. It was evident that the plate, when it was dipped or withdrawn, took up a portion of this marbling, and as the phenomena attending the application of the developer were exactly such as Mr. Lea describes, I was led then to think—and I still hold the opinion—that this oily matter was some organic impurity of the bath, which, under the presence of the developer, instantly reduced the silver in its vicinity. The *cure* for this state of things was to take a piece of folded writing-paper or card-board, the exact width of the bath, and to draw it gently along the surface of the fluid once or twice. This oily material seemed to take kindly to the paper, and the enemy was got rid of for a time, when the sweeping system had to be repeated; so, rather than be teased with a sensitizing fluid in this condition, I preferred to make a fresh silver solution, when, of course, all went right; and I may safely affirm that I *never knew these local reductions of silver to obtain under the use of a newly-made silver solution, however strong a developer was employed.* This scum was not always very readily seen, but the sweeping the surface was always potent in getting rid of the silver patches, so one may presume that it was present in degree. My attention having been once called to the tendency of the bath to throw up this scum in large or small quantities, I found that I could detect the scum upon the plate when it came out of the bath and *before it was either exposed or submitted to the action of the developer*, and that the developer, when applied, would cause the reduction of silver in spots exactly corresponding to the traces of the scum upon the film.

As I consider this point to be one of considerable practical interest, I have risked the being thought tedious, for the purpose of detailing my experiences of these fogging phenomena, which date from the days of Archer to the present time. *Then* the spots puzzled and annoyed me; *now*, when I get a bath with a tendency to these irregular reductions, but which, in other respects, works well, I do not reject the bath as a matter of course, but, taking a tuft of cotton wool moistened with water, I quietly brush away any of these patches which may be left upon the film; and I find I can do this without using any great precaution, and without producing any disturbance of the film or of the image impressed upon the plate, which image will be found duly brought out by the developer beneath this local fog. I may say I was both pleased and surprised to find how well Mawson's collodion bore a moderate amount of scrubbing, and how easily other surface-stains and patches, besides the ones in question, could be got rid of by the simple agency of a tuft of cotton wool.

Then, after summing up my evidence with regard to this "local fogging," I believe it to arise from a particular condition of the silver bath, which, becoming loaded with some form of organic matter, throws up a scum, which scum is picked up by the plate as it comes out of the bath; and that the organic matter so picked up is (quite independently of the action of light) so powerful a reducing or de-oxidizing agent, that in the presence of the iron developer it instantly reduces that portion of the silver solution in its vicinity to the metallic condition.

Yours, &c. John Anthony, M.D.

Washwood Heath, nr. Birmingham, September 29th, 1866.

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Photographic Notes and Queries.

Wetting Dry Plates before Exposure.

Dear Sir,—In reply to "Apothecary's" letter in your last number, I developed by means of the alkaline process usually employed for tannin plates; viz., first moisten the film, and then pour on a two-grain solution of carbonate of soda. When a faint image becomes visible, wash, and strengthen with pyro and silver in the usual way.

I have not tried iron as a developer. I have, however, no doubt it may be used (at any rate with the simply-washed plates without any preservative), but I much doubt whether it would have any advantage over the alkali. My plates were allowed to dry spontaneously.

You are quite correct in your explanation of my meaning in the instruction to "repeat the operation."—I remain, my dear Sir, yours very truly, Baynham Jones.

Cheltenham, October 1, 1866.

Effect of the Vapour of Pine on Iodide of Silver.

Sir,—I see in your reply to a correspondent, "Cyanide," some reference to the effect of pine-wood on dry plates, by which I conclude it is still undecided whether any effect takes place. Will you permit me to give you my experience in the case of "iodized paper?" I once prepared a sheet of paper and placed it in the chassis. Circumstances prevented my exposing it, and it was left for some considerable time. On looking at it afterwards, I was struck by the appearance of a stain, identical in form to a knot in the front of the chassis (white pine). It was impossible to come to any other conclusion than that the turpentine in the knot had caused it (there had been no contact, of course). This fact would tend to strengthen the opinion that boxes of pine wood are not desirable for storing of dry plates.—I am, &c., John Stone.

5, *Bernard Street, Regent's Park Road, N.W.*
September 27th, 1866.

◆

Talk in the Studio.

Alkaline Development of Fothergill Plates.—A correspondent says:—"Some days ago, I prepared two plates by the Fothergill process (without the addition of ammoniacal silver); the one I exposed thirty-five seconds for alkaline development, and obtained a picture fully detailed. The other I exposed at the same time for three minutes, intending to develop it, commencing with plain pyro; but upon repeated applications of a one-grain solution, not the slightest trace of an image could be obtained. I then applied the alkaline developer, and the result was, as I anticipated, that the plate was excessively over-exposed. I find I can work the alkaline development of Fothergill plates without the slightest trace of fog, but it seems to have the effect of very much disturbing the albumen."

Great Eastern Photographs.—A writer in *Temple Bar* criticises severely some photographs of the celebrities recently returned from the successful Atlantic Cable Expedition. He says:—"Half a dozen rather prim gentlemen, some of whom are fumbling at a particularly common-place rope—a conventional simper on their faces, a rigid angularity in their figures, and a pervading air of 'penny plain and twopence coloured' over all. Such are the *Great Eastern* photographs now proffered in our shop windows. I speak sorely, as one who has bought; with authority, as one knowing the originals; and with some diffidence, as essaying at portraiture myself * * * Out on the photographers! I say again; if those children of the sun can do no better than this, let us solemnly devote cameras and lenses, stands and darkened chambers, to the infernal gods."

Suicide of a Photographer with Cyanide.—An inquest was held a few days ago at the Crown Tavern, Mayfield Road, Dalston, respecting the death of Mr. George Nathaniel Trigg, aged thirty-two years, who was alleged to have committed suicide. Mrs. Eliza Trigg, No. 32, Bloomfield Street, Dalston, widow of deceased, said that her husband was a photographic artist. On last Saturday evening she met her husband by appointment, at the corner of Red Cross Street, Barbican. She had been separated from her husband a month ago. On Saturday she spent two hours with him. She left him at six o'clock in Finsbury Square, and returned home. At nine o'clock the deceased was found dying on the door-step. He let a bottle fall from his hand, and died. By the Coroner: The deceased was very depressed in spirits when he left her. They had been obliged to separate in consequence of his failing to get employment. Witness was compelled to return to her family, and he went back to his. They had nothing to live upon. On Saturday the deceased was very desponding. Mrs. Emma Guillin, sister of the last witness, said that on last Saturday night she heard a loud knock at the hall door, and upon going to it she saw the deceased standing at it. He was very pale, and he had a bottle in his hand. She cried out, "Oh, George! what has happened?" and ran and called his wife. Dr. William Hewitt, Kingland Crescent, said that when he was called to the deceased he found him dead. A post-mortem examination of the deceased's body proved the cause of death to be poisoning by cyanide of potassium. The jury returned a verdict that the deceased was insane when he poisoned himself on a certain door-step.

Fire in a Photographic Gallery.—Photographers need often to be reminded that they are handling the most dangerous poisons and combustibles. One would think, from the apparently reckless manner in which photographic materials are everywhere thrown about, that nothing could be safer. Perhaps some suppose that the ether, and the cyanide of potassium, and bichloride of mercury of the chemical room are very different from the articles of the same name, which books on chemistry, and the laws of the land, warn us about. The other day a gentleman sent to several drug stores for a small quantity of corrosive sublimate, which he wanted for destroying bed bugs. He was unsuccessful, for all the honest druggists told him that the law did not allow it to be sold, except on a physician's prescription. Is it out of compliment to photographers that they can get it easier than anybody else? Perhaps it is news to the reader that there is any legal restriction on the sale of such articles. Dozens of fires have originated in photographic galleries from careless handling of collodion or its ingredients. How many photographers have burnt their fingers with collodion and varnish, and have narrowly escaped severer calamities! Unless photographers become more careful, their saloons will come to be regarded as hazardous as powder factories. These remarks, although they have no novelty, are suggested and introduced here on account of several fires which have recently occurred in photographic galleries, the particulars of one of which are given below. The fire occurred at the gallery of Paul Rosenecker, No. 51 Third Avenue, in this City, at about eight o'clock in the evening of July 5th. The proprietor was absent, and his assistant was toning prints by the light of a candle. First the alcohol bottle was upset; probably the operator was groping about in the feeble light, and the alcohol was where it should not have been. Next the candle falls into the pool of alcohol, and the rest might be imagined. The collodion and the gun-cotton go off with explosions, which throw down the partitions and ceiling. By the prompt exertions of the firemen the building was saved, but the photographic part was pretty thoroughly and quickly cleaned out. The whole damage was over $3,000, which was pretty equally divided between the building and its photographic contents.—*The American Journal of Photography.*

Amongst the Announcements in our advertising columns is one of a business for sale, belonging to Mr. J. R. James. Many photographers well know this gentleman as an old and skilful photographer, who has for a long time had a connection in Islington, and is now compelled to relinquish his business, on account of the loss of his sight.

To Correspondents.

Photographer.—Zentmayer's lens is an American instrument. We do not know of any agent in this country. Most probably Mr. Atkinson, of Liverpool, can give you information on the subject.

F.—The proposition in question is one fairly and legitimately open to discussion; but denunciation without argument is unfair. Opinions on the subject are sure to vary; but most of the best men whom we know are much interested in the subject. Mr. Notman, of Montreal, one of the ablest photographers in the new or old world, says, in a letter we have just received:—"I have just received the News, and read Mr. Claudet's paper and your own article on the subject of 'Distribution of Focus.' I do not remember when I read an article with greater interest. Whatever may be the issue, it seems to me to point in the right direction." We have seen the advertisement. It is not a subject which, in any sense, comes under our notice for discussion or comment.

T. J.—Your description is scarcely sufficiently precise to enable us to judge with certainty of the cause of your trouble. But it seems probable that you do not sufficiently wash the plate after development and before fixing, and the "bluish mist" is really the result of a reaction between the traces of iron solution left in the film and the cyanide of potassium. By mixing your developing and fixing solutions you form Prussian blue.

Palette.—The principle is the same in the description to which you refer and in the house built. The application of a principle may often demand modification in special cases. It is sometimes useful to continue the side light the whole length of a room, because, although for ordinary work a few feet next the background must be opaque, yet at times, for special effects of lighting, the whole will be required. In a studio for ordinary portraiture of your proposed dimensions, it will probably be best to have 4 feet at each end opaque. 2. The side should not be less than 8 feet high; and the side and slope should be of glass. 3. There are various kinds of corrugated glass: we are unable to state with certainty which kind is best. We should select that which obstructs the least light. But so far as we can see, you will not need any. 4. In a house so short, you will require different lenses for different purposes; in a long studio, a lens of long focus, which will produce large pictures. For card pictures, your lens should not have an equivalent focus of 7 inches at most. 5. The portrait triple you mention might be used for pictures in which a standing figure of a man is required on a half-plate, but not for smaller pictures. It might be used for cabinet portraits, busts, and three-quarter length figures. We like pictures Nos. 1 and 2, of those sent, the best.

Henry Hele.—We believe that Mr. Solomon keeps resinized paper. It used to be prepared, according to Mr. Cooper's formula, by Mr. Francis, Chemist, Upper Street, Islington; but we are uncertain whether he keeps it in stock or not. 2. We have no certain knowledge of the nature of the Lucidonic colours advertised, except that they are liquid, transparent colours, and that the pictures coloured with them look well We think it very probable that Mr. Solomon will sell specimens, and probably at a moderate price. 3. The admixture of a very little albumen with water-colours is said to make them take kindly to the surface, and produce an effect free from the patchiness you describe. 4. Mr. J. P. Bligh's address is 6, Ashley Terrace, Plymouth.

F. M Y.—We cannot explain the circumstance that the plain pyro had no effect on the plate in question. It is singular and interesting. A moderately strong iron solution is best for resin plates. We are glad to hear of your success, and shall have pleasure in hearing further details of your operations with these plates.

Faust.—We can assign no certain cause to the spots in question; but they appear to be due to something in the paper; and each one has a small centre. As you may have observed, they are more apparent at the back than at the front of the print.

T. W. L.—The copyright in an engraving continues for twenty-eight years after the date of first publication. 2. Many articles on the solar camera and its working have appeared in our pages. One containing detailed description, with diagrams, will be found in our Third Volume, February 10, 1860.

C. C. C. (Cornwall).—The difference between the prices of good and bad lenses is very similar to the difference between the prices of many other things which admit of wide difference in quality. You may, for instance, buy a watch for a couple of guineas, and you may give forty guineas for another which may differ very little in outward appearance; and yet the price of each may represent its actual value. We have had no actual experience with the half-plate lens you name, but should hesitate to recommend its purchase for producing cabinet portraits. 2 The triple lens is well suited for landscape and street views. 3. No. 4. The removal of the central lens from a triple is simply to shorten its focus and increase its rapidity, whilst, of course, it limits its field. 5. A double combination stereoscopic lens is suited for street views. 6. Enlargements can be produced by means of a half-plate lens, either employing it in a solar camera, or for producing an enlarged negative in the usual way. Mr. Hughes has a new edition of his work in the press. It will contain instructions for producing enlargements.

T. A.—We shall be glad to see the second article,

Several Correspondents in our next,

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 423.—*October* 12, 1866.

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CARBON PRINTS IN CIRCULATION.

It is a noteworthy circumstance that at the commencement of the winter session of the photographic societies, two of the London societies have distributed amongst their members presentation photographs printed in carbon by Messrs. Mawson and Swan. The photographic public have been, during the last year or two, gradually becoming familiar with the results of Mr. Swan's process by the examination of occasional specimens; but many have asked, "How is it, if this process, which produces such beautiful results, be really practicable, that we only see occasional specimens from two or three negatives, instead of numbers of commercial results?" Such a question admitted of a very simple answer, in the statement that the inventor and patentee was unwilling to introduce his process to the public commercially until he had thoroughly tested it and brought it to the highest perfection; and by the further explanation that being a busy man, whose professional duties in connection with the manufacture of photographic chemicals only permitted the devotion of a small portion of his time to the working out of his carbon process to perfection, this testing operation was necessarily a slow one.

The prints just issued, however, are the best practical illustration of the capabilities of the process. The North London Photographic Association only decided within the last month or two upon the picture to be presented to their members, and the prints are now already in the hands of all who attended the first meeting, held on Wednesday week, and will shortly be in the hands of the remainder of the members, in all, about a hundred, we believe. Those of the South London have been longer in hand, having been printed twice over, because, when completed, Mr. Swan conceived that he could produce a tone more in keeping with the sentiment of the picture. But here is the fact that these prints are now distributed, almost broadcast, amongst the members of two London Photographic Societies, who may be fairly supposed to be critical judges of the excellence of the work; and we have no hesitation in claiming for it pre-eminence over silver prints on the score of beauty as well as permanency. With the exception of a few whose art education has been entirely formed on photography, and who regard the effect of a good albumenized print as the highest pictorial result possible, all to whom we have shown examples of these prints are delighted with them. Artists—by which term we mean painters—are especially charmed with the texture and quality of surface, as well as the delicacy and softness of the gradations, and readily tender their highest expressions of praise.

The pictures themselves are fortunate subjects as tests, demanding delicacy and force to do them justice, and well repaying, by their pictorial excellence, the justice they received from the process of printing. The first delivered to the public was the presentation print of the North London Photographic Association. This picture has excited some attention of late, not only by its beauty as a composition and perfection as a photograph, but as an example of the distribution of definition which could be produced, without fuzzinesss, by the use of a lens constructed by a skilful optician, with an express aim to such a result. At the reading of Mr. Claudet's paper, at the British Association, Mr. Taylor exhibited this picture, and challenged conclusions upon it, as illustrating the possibility of constructing a lens diffusing the focus so as to get rid of microscopic sharpness in one plane, and secure sufficient definition in all necessary parts of the picture. The negative, 16 by 12 in size, is by Mr. H. P. Robinson, and is one of his most successful attempts in producing a fine composition and charming picture in one negative. The subject is entitled "Waiting for the Boat," and a couplet from one of Mr. Hain Friswell's charming poems, entitled "The Last Boat," printed beneath the picture, admirably suggests the idea embodied, the lines being—

> "Musing, I sit upon the shore,
> Awaiting till the boat shall come."

A couple of girls are sitting on a bank. with the evident expression of watching and waiting for the arrival of something. They are in the simple rustic dress of country girls, no masquerading style of costume being employed to gain factitious effect. The position is easy and unconstrained, the elder girl's arm being thrown loosely over the shoulder of the younger, who leans against her sister. It is in the head of the eldest, however, that the interest is concentrated. One of the most noble and beautiful faces we have seen portrayed by photography, most exquisitely modelled, every undulation and dimple so perfectly rendered that it is rather like a sculptured head than a picture. The well-cut features, the glorious eyes, the rich flowing locks, are all perfectly defined, but there is not a hard line anywhere; all is perfectly made out, the contours perfectly rounded, but alike without the crude rendering of freckles or coarse texture, or the loss of softness in any part. Altogether it is a picture upon the presentation of which to its members we heartily congratulate the North London Association.

The South London presentation print is one which has already been seen and admired by many photographers, the picture being "The Zealot," by Mr. Valentine Blanchard. We here remark, in passing, that it is a satisfactory illustration of the growing interest in the pictorial capabilities of photography, that two societies have chosen as their presentation prints photographs in which the fitness of the camera for giving embodiment to the pictorial conceptions of the true artist is ably vindicated. Mr. Blanchard's picture is one of the noblest single figure subjects ever produced by photography, and depends for its chief interest on the most difficult of all qualities to secure by photography—expression.

"The Zealot" is a 12 by 10 picture, with a single figure, that of a monk. The idea embodied is well expressed in Wordsworth's lines beneath it—

> "One in whom persuasion and belief
> Had ripened into faith, and faith become
> A passionate intuition."

Every line in the burning earnestness of the face, every line in the rigid muscles of the hands, every line in the pose of the figure, expresses the intensely wrought feeling of one whose merely human nature is altogether overmastered by his passionate zeal. The delicacy of the modelling, the breadth and grandeur of the masses of light and shadow, are exceedingly fine, but these are subsidiary to the perfect rendering of the thought expressed in the picture.

We repeat, that we regard it as matter for congratulation that two such embodiments of the art capabilities of photography, and two such examples of the first practical process of absolutely permanent printing, should be presented to members of these societies at the commencement of one season.

SULPHATE OF COPPER IN THE DEVELOPER.

The pages of the Photographic News have frequently contained references to an old recommendation, consisting in the employment of sulphate of copper in association with the iron developer.* Admixture with the first-named salt certainly tends to diminish the rate of atmospheric oxidation, whilst the mixed sulphates of iron and copper are said to give denser images than the ferrous salt employed alone. To those who are desirous of carrying on experiments in this direction, it may be of interest to know that a salt has lately made its appearance in commerce, which possesses a property that the unscrupulous manufacturer probably never intended; viz., the power of developing collodion negatives. We refer to a spurious sample of sulphate of copper which has just now come under our notice. Its colour is paler than usual, but there is nothing in the appearance of the salt to lead one to the knowledge that it contains but *one-fourth* the usual proportion of copper, the rest being made up of a mixture of the sulphates of zinc and iron.

The composition of the above metallic salt, which takes a regular crystalline form, and is unalterable by exposure to air, suggests the possibility of using sulphate of zinc, instead of the corresponding compound of copper, for the purpose of preparing developing solutions of which the double sulphate of iron and ammonia is the type. White vitriol, if it answers the purpose, would be preferred to the blue, on account of its permitting the progress of development to be more closely watched.

Critical Notices.

VIEWS OF THE ENGLISH LAKE SCENERY. By Nelson K. Cherrill.

Few of the young and rising photographers of the day have evinced a juster appreciation of the relation of the various parts of our photography in producing a perfect whole, as art and science, than Mr. Nelson K. Cherrill. It has afforded us considerable pleasure, therefore, to find, in examining a somewhat extensive series of his productions, that a thorough knowledge of the art and its requirements, theoretically, is accompanied by a high degree of manipulative skill, which has produced results little short in excellence of those of many of the experienced masters of the art. Mr. Cherrill holds the view that the most perfect technical results are obtained when all the preparations are so balanced that the proper degree of printing intensity is obtained by one application of the iron developer, without any after intensifying; and the pictures before us are from negatives obtained by working on this principle. The experiment, it must be admitted, is a somewhat bold one to attempt to carry out,—working in a dark tent, in remote mountain passes, with all the inconveniences attaching to landscape photography in a somewhat rugged district. The result has been, however, highly successful, and Mr. Cherrill has produced a series of exceedingly fine photographs of the fine scenery abounding in the neighbourhood of the English lakes.

Several views of Borrowdale are remarkable for their delicacy of gradation and perfect harmony. This is especially marked in all the pictures; however brilliant, there is nothing hard; no chalky lights and no black shadows. In a photograph of Stock Ghylle Force, for instance, with a rocky foreground, abundance of foliage, and a comparative thread of water leaping down, there is no loss of detail anywhere; the foreground is brilliant, the foliage is fully made out, and the falls sparkle like leaping water. A view containing Wordsworth's yew tree, full of difficult contrasts, is rendered with similar harmony. The Falls of Lodore, to which Southey has given celebrity, make in Mr. Cherrill's hands a most charming picture. Although, from the poet's description, a grander and more turbulent cataract might be expected than the silvery little cascade found in reality, yet, from its charming surroundings and general effect in the photograph before us, it is almost perfect in pictorial effect. Many other of the Lake pictures are also very fine, but we have not space for a detailed notice.

One especial feature in these pictures is the presence of atmosphere and of cloud effects. In many cases these are obtained on one negative, at the same time as the landscape; but in many others the clouds are introduced by skilful double printing. Of these, some views of Folkestone Harbour, with sea and shipping, are very effective examples, admirably illustrating the pictorial value of this mode of giving completeness to a picture. Mr. Cherrill has shown, at some of the public exhibitions, his very fine photographs of machinery, especially some of the interiors of the engine works of Messrs. Penn and Co. Some of the same class of pictures before us, which, from the depth of definition required through a long workshop, full of complex forms and bright surfaces, are by no means easy to reproduce by photography, are admirable examples of what is possible in this direction when care and skill are brought to the work.

STEREOGRAPHS OF SCOTTISH SCENERY. By J. Stuart.

We have heard an opinion expressed, somewhat frequently, during the last two or three years, to the effect that stereoscopic photography was a thing of the past; that the public had ceased to take interest in slides; and that their production was no longer a profitable branch of the profession. It is probable that this was true in some degree, but in a much more limited extent than many persons believed. In any case, we are glad to learn, from those who speak with authority, that good stereoscopic views of popular subjects still have a steady demand. The namby-pamby subject pictures of weddings, christenings, and scenes in social life, in which some weak attempts at fun, of very questionable taste, were made, are, indeed, quite out of date; but views of scenery visited by tourists, of buildings of interest, of cathedrals, &c., in which the stereoscopic projection of the image possesses especial value, these, when well done, still find purchasers.

On these grounds, the series before us possess a fair claim to public attention. So far as we know, Mr. Stuart is a new candidate for public appreciation in this field, and presents in these pictures credentials which will justify his claims. Highland scenery possesses an abiding interest to the tourist, and the qualities which give it that interest render it especially valuable to the photographer—its wild picturesque character. The brown heath and shaggy wood, the mountain and the flood, which charm the poet, and the painter, and the public, can be admirably rendered by the camera. A sunny, fertile, champaign country may be very beautiful in itself, but is very tame and poor in photography; wood and water, mountain, glen, and gorge, are the materials most effective in landscape photography. And here we have them in perfection. "The Linn of Quoich" is a charming scene and an admirable photograph. "The Linn of Dee," in the same neighbourhood, is an exceedingly fine picture, in which rock and water, foliage and distant mountain, are rendered with admirable softness and brilliancy. "The Head of Loch Katrine" is a capital picture, most admirably composed. There are several views of Balmoral, some of which are taken from a point of view giving a much more picturesque effect than any we have before seen of the same subject. All the pictures are good, and some are surpassingly excellent. Mr. Stuart is engaged, we understand, with a series of Canterbury Cathedral, one example of which we have before us. It is one of the most perfect stereoscopic interiors we have ever had the pleasure of seeing. The lenses employed were, we understand, Ross's new doublets, and appear to have done their work very satisfactorily.

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* *Vide* Photographic News, p. 281, 401, and 461 of present volume.

THE MAGIC LANTERN: How to Buy and How to Use It: also, How to Raise a Ghost. By a Mere Phantom. Tenth Thousand. (London: Houlston and Wright.)

Less than twelve months ago, we had pleasure in commending to the attention of our readers this little volume. We are glad to perceive, from the new edition before us, that the public has endorsed the favourable opinion we then expressed, and that ten thousand copies have been printed to meet the demand. The author, who styles himself a "Mere Phantom," but who, we can assure our readers, is an estimable gentleman and skilful photogtapher, has shown his appreciation of the public approval by a considerable amplification of his work, the present edition containing a score of additional pages and much additional information, amongst which will be found instructions for raising ghosts after the manner of Professor Pepper and others, who have, during the last few seasons, awed, puzzled, or amused the public by skilful optical illusions, such as the "Sphinx," the "Modern Delphic Oracle," &c. We need simply reiterate our formerly expressed opinion that the work admirably supplies an actual want; and all interested in the legitimate means of instruction and amusement afforded by the magic lantern will doubtless possess themselves of this manual.

RECOVERY OF NITRATE OF SILVER FROM PAPER ASHES.

BY JOHN SPILLER, F.C.S.

I have lately tried the very simple method described by Mr. L. H. Laudy[*] for the recovery of nitrate of silver from waste sensitized paper. It consists merely in burning the scraps of paper, dissolving out the silver from the ashes by nitric acid, evaporating the solution to dryness, and re-dissolving the nitrate in pure water. I was not prepared to find so large a proportion of the silver rendered soluble and recovered as nitrate by this plan, but the result proves that the chloride is nearly all reduced to the metallic state by the hydrocarbon vapours emitted during the combustion of the paper, so that, practically, the whole of the silver is obtained in an immediately available form. The solution contains, however, a trace of sulphate of silver, which is no doubt derived from the sulphur existing in the albumen. Notwithstanding the instructions to the contrary, it is quite worth while saving the insoluble residue left after the full action of nitric acid and water, for although it contains but little silver, this can be easily worked up with the ordinary chloride residues, by fusion with carbonate of soda; and in the event of the cuttings from toned prints being operated upon with the rest, the gold in them will likewise be recovered.

CARBON PRINTING.

No. 2.—Working with Swan's Tissue.

BY NELSON K. CHERRILL.[*]

For those who intend to adopt carbon-printing—and all those who aim at perfection in their results would do well to adopt it—Mr. Swan's tissue will be found to supply almost every want; it was only to meet exceptional cases that I mentioned in last week's News the mode in which I have been making tissue for experimental purposes. I now come to consider a few points touching Mr. Swan's tissue, and to give, as concisely as I can, the exact result of my experiments with it.

I must premise that all the readers of the News are by this time aware that Mr. Swan uses a continuous length of (I believe) 24 feet of paper in the preparation of his tissue. This paper, being formed into a band, is passed on rollers over the surface of thin gelatine solution, to which an adequate amount of pigment has been added. Mr. Swan now sensitizes the tissue for his own use as it is prepared; but the tissue will be, as a rule, supplied in the non-sensitive condition.

The solution of bichromate of potash for sensitizing should not be used many times over. I do not know how often it may be used, but as it is very cheap, it would not add much to the expense of working this process to use it quite fresh each time. If the same quantity of solution is often used, it will in time fail to give sufficient vigour and depth to the proofs. This is no doubt owing to its inefficient action. Now the fact of keeping the solution in a bottle with a quantity of crystals of bichromate at the bottom undissolved makes no difference, because I have tried it. My advice is, then, till at least we know much more about it than has as yet transpired, to use a fresh batch of bichromate solution for each batch of tissue prepared.

Although the tissue is said to keep a week in its sensitive condition, I have found it much better on the first day than on the second. One thing is, to me, very certain, viz., that if it is to be kept more than forty-eight hours, some means must be taken to secure it well from damp.

The solution of india-rubber should, it is said, be applied rather by floatation than by means of a brush. Now, unless the printing operations are carried out on a very large scale, the operation of floating pictures on benzole is neither a pleasant nor an economical one: not that it would be any more pleasant in large operations than in small ones; but when there is a considerable number of prints to be done, there must be an awful smell any way; so that having a dish full of the stuff would not make much difference. I do not think it would be difficult to make a sort of machine by which an even coating of india-rubber could be applied: this would be a great advantage. Meanwhile, I do not find that if the brush-marks are crossed two or three times, the slight ridges which are left on the surface of the print make any practical difference to the result; but the india-rubber must be *quite dry* before the paper and the tissue are placed in contact. I have lately tried a mode of work which seems to me better than brushing the rubber over both the paper and the tissue. It is this: the tissue is well coated with the solution, and, while still wet, the paper, previously cut to the right size, is pressed down evenly upon it. It is then again torn off, and the two are left to dry before being again placed in contact. This, when carefully done, ensures a considerable degree of smoothness in the layer of india-rubber.

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[*] Photographic News, page 462 of present volume.

[*] Continued from p. 460.

To prevent the tissue from sticking to the negative, it is well to rub them both over with finely-powdered French chalk, to be bought of the chemists.

Carbon prints may be transferred to any substance which will give a good holding-ground for gelatine. I have made many experiments to determine the best conditions for securing good transfers to silk, the difficulty being to get the picture quite flat when complete. This I tried in various ways, but have at last succeeded in a way I did not expect. I coat the print with gelatine—or rather with isinglass solution—and then, when very nearly dry, and just "tacky," I pass the print, set to its proper position on the silk, through the rolling-machine three or four times. This secures a perfect adhesion, while the print does not seem to contract much in drying. I have been quite unable to succeed in this way of working when using the silk wet; it does not seem to expand or contract with sufficient regularity to ensure a certain result.

I can bear testimony to the extreme efficacy of Mr. Swan's mode of water-proofing, from the fact of having waterproofed one of my silk transfers, which I was afterwards desirous of removing from the fabric. I was unable to do so; and though I used hot soap and water and a vigorous application of my finger-nails, the film only came off in little bits at a time; and the texture of the silk was so much injured in the attempt to remove the picture as to render it quite useless.

It seems to me that carbon printing will open up a grand field for the ornamental application of photography. The operation of making the transfer is so simple, and the surfaces to which it can be made are so numerous and varied, that if once the fashion were set up, no doubt large numbers of prints of suitable subjects might be sold for ladies to use in their various fancy works, in the case of such transfers as decalcomanie, &c.

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THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

A Few Reasons Why a Photographer's Relief Fund should be at once Instituted.

"O suffering, sad humanity!
O ye afflicted ones, who lie
Steeped to the lips in misery,
Longing, and yet afraid to die,
Patient, though sorely tried,"
For you I plead.

To improve on the lesson suggested by Death's visitations under ordinary circumstances is a work which more especially comes within the province of our spiritual advisers; but when grim poverty has urged its long-suffering victim on to seek a deliverance from his woes by the self-inflicted hand of violence, it becomes a stern duty, imperative on all, to enquire the reason why that Death, so generally feared, should be prematurely sought after and regarded as a better friend than man has proved to the misery-stricken sufferer. Although "the web of life is of a mingled yarn, good and ill altogether," the ofttimes quoted term, ill luck, is comparative, and therefore admits of many definitions. Poverty is a bitter ingredient which an all-wise Providence has seen fit to intermingle with every human population; and wherever civilization, or the least semblance of it, exists, there is a silent voice, crying, "Remember the poor!" and within every bosom is placed a sympathetic chord that vibrates with emotion when the tale of woe is told to listening ears. That many hearts have been touched is best shown by the noble monuments of charity scattered over the world, within whose walls poverty can be defied.

The many devices employed in grappling with grim poverty would need a volume to enumerate; suffice it, for our purpose here, to say their name is legion. Charities generalized; charities secularized; charities spiritualized; charities classified, divided, and subdivided. Among these, I have only to consider charities as classified; or, in other words, charities which are founded by sections of industrial workers. Professional workers, such as lawyers, doctors, artists, and others, who toil in the higher spheres of labour, each, as a class, maintain a fund for the relief of their members who stand in need of pecuniary assistance; and so popular has the scheme grown, that, in many instances, surplus funds have been found to devote to educational purposes, by which the orphan is wrested from the grip of want, and ultimately turned out into the world a useful member of society.

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My brothers, my sisters, who find profit or delight in the practice of photography, allow me, with all the gravity and solemnity the case demands, to direct your attention towards a paragraph in the studio talk of the last week's News. A photographer has died by his own hands, and the "temporary insanity," as mercifully interpreted by the jury, was gnawing hunger; biting want; loss of what was perhaps a once happy home; a separation from the wife of his bosom; hopes deferred; a heart-sick, a goading despair; a blank: the deadly poison rapidly did its work, and a wife is made a sorrowing widow.

My readers, our brother's blood must not cry to us in vain, or perhaps, ere the winter, now growing near, has spent its strength, many, whose lives "are now steeped in misery, longing, yet afraid to die," may overcome that fear, and seek relief in self-inflicted death. The past summer has proved exceptionally bad to our profession generally; monetary crises and crashes, fogs, rains, and other causes, have worked ill on photography; it therefore behoves every photographer, professional or amateur, to set their shoulders valiently to the wheel at once, and assist the Editor of the News in carrying out the work he so generously started a few months ago. The prospects of success, if a Photographers' Relief Fund is instituted, are specially favourable, as photography numbers among its followers rank, fashion, and wealth. And I see no reason why an appeal to the wealthy amateur should fail in its mission, as I have reason to believe that more enthusiastic lovers of our art do not exist than are found among the class described. A lady, who enjoys a high position in social rank (in a business letter directed to myself), writes:—"I feel acutely where photography is concerned." Aye, and I feel sure that same gentle heart would feel more acutely when an appeal on behalf of the poorer followers reached her ear; and not only the ears of the lady referred to, but the same effect would follow when the cry "Remember the poor!" was scattered broad-cast o'er the entire world-wide field of photography. Then let us set to work at once. Let us form a fund from which a suffering brother may draw a lease of life, a ray of hope, a gleam of happiness, a chance of heaven. Let it no more be found that in our ranks exists a hunger-stricken one, so "steeped to the lips in misery," that to die 'twere seeming happiness; to live 'twere growing agony.

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ON THE PRODUCTION OF PHOTOGRAPHS IN PERMANENT COLOURS.

MM. BEYSE AND JOSS' METHOD.

Blond Solution No. 10.—Twenty grains of iodide of potassium and 20 grains of sulphate of iron are put into a 1½-ounce bottle, with 400 grains of distilled water; when dissolved, fill up the bottle with thick gum-water, and mix well by shaking. By varying the proportions of iodide of potassium and sulphate of iron, any shade of blonde may be obtained.

Brown Solution No. 11.—Twenty grains of hyposulphite of soda and 20 grains of iron are put into a 1½-ounce bottle, with 400 grains of distilled water, and, when dissolved, sufficient gum-water is added to fill the bottle; the solution to be well mixed by shaking.

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* Concluded from p. 425.

Carmine Red No. 12.—A drachm of finely powdered carmine is put into an evaporating-dish with 3 ounces of fluid ammonia, and heated over a spirit-lamp till the carmine is dissolved, stirring it the while. The solution is stored in a bottle, and when required for use it is mixed in the following proportions: two parts of the solution to one part of distilled water and one of gum-water.

Brazil Wood Red No. 13.—Two ounces of finely-rasped Brazil wood are digested for twenty-four hours in a mixture of four ounces of distilled water and a like quantity of white wine vinegar, and afterwards evaporated to half its original bulk, adding two drachms of alum during the process; the liquid is then strained through a fine piece of linen. When required for use, it is mixed in the following proportions: two parts of the liquid to one part of fluid ammonia, and one part of gum-water. This red is well adapted for treating those portions of a picture fixed of a cinnabar, or fiery red colour.

Aniline Red No. 14.—Two parts of the ordinary aniline red of commerce are mixed with one part of ammonia and one of gum-water.

Indigo Blue No. 15.—Half an ounce of the finest indigo is put into a saucer with two ounces of strong sulphuric acid, and allowed to remain for twenty-four hours. Then add, gradually, as much ammonia, stirring the liquid at the time, till blue litmus paper is no longer affected by it. When required to be used, it is mixed in the proportion of two parts of the liquid to one part of distilled water, and one of gum-water. This liquid must be applied very sparingly, and only allowed to remain momentarily in contact with the picture, otherwise a whitish tint will be produced.

Indigo-carmine Blue No. 16.—Half an ounce of dry indigo-carmine is dissolved by pouring over it an ounce of distilled water and four ounces of fluid ammonia. It is mixed in the proportion of two parts of the liquid to one part of distilled water and one of gum-water. This blue is very brilliant and remarkably easy of manipulation, and therefore well adapted for use by beginners.

Aniline Blue No. 17.—Ordinary commercial aniline blue is mixed in the proportion of two parts of the blue to one part of fluid ammonia and one part of gum-water. This colour yields a beautiful sky blue.

Indigo-iron Blue No. 18.—By adding sulphate of iron solution in different proportions to Nos. 15 and 16, different shades of blue are obtained.

Sap-green No. 19.—Forty grains of genuine sap-green are dissolved in 100 grains of fluid ammonia and 200 grains of distilled water, and then as much distilled water and gum-water is added as is required to bring it to the proper degree of consistency.

Retouching Liquid for general use No. 20.—Dissolve 10 grains of pyrogallic acid in 400 grains of water, and add 400 grains of Indigo Blue No. 15; 10 grains of iron are then dissolved in a hundred grains of water, and the two solutions thoroughly mixed by shaking, and finally diluted with gum-water.

By adding either Carmine Red No. 12, Brazil Red No. 13, Persian-berry Yellow No. 7, Turmeric Yellow No. 8, Indigo-carmine Blue No. 16, brown violet or blonde retouching colours may be obtained.

In publishing this method of photographic colouring, the inventors trust that any photographers availing themselves of the same will be good enough to make known any results that they may obtain; and should any further information respecting the process be required, the inventors will be happy to reply to any prepaid communications addressed to them, No. 4, Dorotheagasse, Pesth.

ON A NEW METHOD OF TREATING THE IODIDE OF SILVER FILM IN THE WET COLLODION PROCESS.*

We are not yet acquainted either with the physical constitution of the sensitive film of iodide of silver, nor have we yet found out the nature of the change it undergoes when exposed to the action of light. Investigators are continually writing upon the subject, but the problem has not yet been satisfactorily solved. If we accept colour as an indication of a certain molecular constitution, we shall find that we are acquainted with a great variety of iodides of silver. Within our own experience, we have met with iodides of all shades, from yellowish white to a dead black. White generally indicates a sensitive iodide, although not always; bright yellow, an insensitive iodide; and brown, an iodide in a modified form, capable of reducing nitrate of silver.

The sensitiveness possessed by an iodized film on a glass plate is due entirely to the condition of the iodide, and not in any way to the different liquids with which it has been treated, excepting the water, which must be regarded simply as a medium for chemical operation.

Some two months since, while making some experiments with iron developers, we obtained a most remarkable result, which, had it not been confirmed by a distinguished amateur photographer, M. Georges Hachette, we should not have communicated without further investigation. My experiments were conducted by means of long slips of glass, coated with collodion at one end only, so that they could be held in the hand; in this manner a large number of operations may be carried out in a short time. The collodion was submitted to the action of light by gradually displacing a piece of yellow glass covering the reverse side of the plate, exposing the same at a small orifice made in a partition to admit the light. These experiments were conducted for the purpose of comparing the qualities of different iron developers, and it was found necessary to exhaust the action of the iron, in order to observe any slight changes which might occur. On one occasion, after developing an image, consisting of dark bands, extending from the extremity of the plate furthest from the hand—a portion of the coating being allowed to remain intact—the plate was exposed to the action of light again, the coloured glass being placed this time obliquely across the back of the plate, in order to distinguish the two operations. To our surprise, that portion of the plate which had not before been exposed to light became covered with dark gradations, even more intense than those on the other portion, although the exposure to light was of the same duration in both cases; the marks thus produced did not at all encroach upon the fainter lines previously developed, thereby proving that an iodide film, in which a portion of the silver had been reduced, had become quite insensitive to light.

We have not yet had any opportunity for making any further experiments with this new sensitive iodide film for the production of ordinary negatives, and we are therefore unable to say whether good half-tones may be produced with it. If it should be found to answer, some very important improvements may be effected in photographic manipulation. The great inconvenience attending the working of the wet collodion process is the impossibility of allowing the plate to remain any length of time after removal from the bath, before exposure in the camera, as it soon becomes useless, on account of the dessication of the liquid, which keeps the iodide film in a moistened condition. The plate may remain for some little time out of the bath, provided it be again dipped before being developed, as the nitrate of silver does not in any degree affect the latent image. The retention of an intense image on an iodized film previously treated with a developer proves that the silver solution exerts an influence on the image only when a developing agent is present.

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* *La Lumière.*

This innovation will produce many beneficial results. Instead of exposing a plate immediately after taking it from the bath, we shall first wash it in the ordinary iron developer, and in this manner we shall obviate the inconvenience arising from a plate becoming dry—the silver solution clinging to the plate having become much diluted by the washing—and consequently the exposure to light may be postponed as long as necessary. The following method must, however, be adopted:—The plate must be first washed in water, then replaced in the dipping-bath, and finally developed in the ordinary manner.

We shall proceed with our experiments as soon as possible, but in the meantime we invite any one, desirous of so doing, to investigate the subject.

Recent Patents.

STEINHEIL'S PERISCOPIC LENS.

The following specification describes the form and construction of Steinheil's Periscopic Lens, and the claims made for it:—

This improved combination of parts is termed a "periscopic objective lens," suitable for taking correct photographic pictures, either of landscape or architecture, producing a picture strictly faithful to nature in the angles represented and in its correct tangential projection. This arrangement of lens admits of angles of 90°, or even more, being taken correctly; the size of the image is equal to double the focal distance of the objective lens; the latter is calculated from the main point or centre of the objective lens, which lens consists of two lenses of the same description of glass and of positive focus. These lenses may be quite equal or similar to each other, placed in inverted positions with the concave sides opposite to each other, and at such a distance apart that all the chief rays cross each other at the same point in the axis between the two lenses. This is the only chief point of this combination of parts forming the objective lens, and the two lenses must be sufficiently curved that the image shall fall within a plane which is normal to the axis, whereby the lenses take the form well known as "menicken," in which the raised surfaces project outwards. As it is with every image plane, there are also in this combination small dissentions from the level for rays which are lying between the calculated points and the proportion between the length of the first radius and that of the second radius, which, being negative, depends on the dimensions of the angle of the image which is to be represented when this dissention is most limited.

For instance:—

Angle of image.	1st radius.	2nd radius.
45°	1	:—1·1407
70°	1	:—1·1529
90°	1	:—1·1828

The distance of the lens is found by trigonometrical calculation, for the ray of light, if followed from refraction to refraction of both lenses, will be correct if the main ray, which projects, lies within the prolongation of the entering ray. If an opening of 1-29th of the focal distance be given to the diaphragm or stop placed between the two lenses, then the image or picture produced will be sharp up to 90°, with a sufficiently good light and ninety seconds' exposure to obtain a complete picture. Objective lenses of this improved construction can be made of all dimensions, but it is important to observe that no other calculation is required for different descriptions of glass, the objective glasses of all dimensions being obtained by multiplying the statement herein given by the necessary formula. The dimensions of an objective glass of 90° of image angle are as follows:—

Diameter of both lenses quite open	10‴
Diameter of stop or diaphragm ...	2‴
Focus of objective glass	78‴
Size of image	156‴
1st radius	13·95‴ convex
2nd radius	16·50‴ cancave
Thickness of lens in the centre ...	1·00
Distance of lenses from each other	6·60

The second lens is similar to the first, but placed in an inverted position, so that the concave sides are placed opposite to each other, as shown in the drawing hereunto annexed. This improved periscopical objective lens differs, not only in its construction and combination from all other objective lenses in use, but also in the greatly improved photographic effects it produces in the pictures obtained by its use.

The best photographic lenses in use consist of a combination of crown and flint glass, in order to neutralize the refraction of the rays; whereas this improved periscopical objective lens consists of two lenses made of the same description of glass, the diameter of the periscopical objective glass amounting only to 1-15·6 of the diameter of the image.

With the American globular objective lens (which possesses greater similarity to the periscopical objective lens than any others), the diameter of the objective glass amounts to about 1-4·4 of the diameter of the image, whereas the periscopical objective lens, with equal size of image, is about four times smaller, or, in proportion to the surface, fifteen times smaller than that of the globular objective glass.

The image angle which the periscopical objective lens admits of taking in is about 90°, whereas with the globular objective lens it is scarcely 50°; therefore, with equal focal distance, the image surface is 4·6 times larger by the application of the periscopical objective lens; nor can any other objective glasses be compared in their results with this improved construction of periscopical objective lens, as they have a much smaller field of sight, and are far more costly to construct than this improved construction of lens. A globular objective glass which renders images of 26 inches diameter is about seven times more costly than a periscopical objective glass, which renders images of 30 inches diameter, independent of its embracing a much larger field of sight than any other arrangement known.

In many instances an image angle of 90° is not required; but if the image should embrace only 75°, then the dimensions would be reduced to the burning focus of 78‴, as follows:—

Diameter of the lenses (free opening)	7‴ 5
Opening of stop	2‴ 0
Distance of burning focus ...	78‴ 0
Dimensions of image	120‴ 0
1st radius	12‴ 502 convex
2nd radius	14‴ 413 concave
Thickness of lens in centre ...	1‴ 0
Distance between lenses	6‴ 26

The chemical focus, with all objective glasses made of the same kind of glass, cannot be brought to coincide with the burning focus of the central rays; the chemical focus is, with the periscopical objective glasses made of mirror glass, 1-52 of the burning focus shorter than the optical focus; therefore with 78‴ burning focus it is 76‴·5. But this does not cause the least disadvantage, because the slide is so regulated that the body of collodion is 1-52 burning focus nearer to the objective glass than the screen or surface of the crystal or focussing glass. With this periscopical objective lens, near and distant objects appear equally clear, and it is not necessary that the camera should be capable of adjustment, as its correct dimensions can be determined when first made, so as to suit the dimensions of the periscopical objective lens for which it is required; and being once regulated it always remains correct, its crystal or focussing glass not being required; when the "slide" is placed in position the image will be clearly obtained. As the camera must be placed, when in use, in a true horizontal position according to the rules of perspective, the image is determined without the trouble of focussing the picture, by simply observing the image angle above and on the sides of the camera.

Thus, by means of this improved construction of periscopical objective lens, it is not only possible to copy extensive landscapes as the artist may desire to obtain them, but the interiors of rooms or buildings may be faithfully reproduced, a result which has hitherto been but indifferently accomplished; at the same time the taking of the photographic picture is rendered much more simple, as no alteration is required in the camera, the camera itself being also much shorter.

OBTAINING PRINTING SURFACES BY PHOTOGRAPHY.

BY FRED. VON EGLOFFSTEIN.

The following invention received provisional protection only:—

This invention relates to the use of a heliographic and photographic spectrum for producing printing surfaces from transparent photographs prepared in any of the usual known ways. The spectrum may be composed of a single sheet of highly polished level ground plate glass, free from colours and covered with a good asphaltum etching ground, heated and smoked over a wax paper in the manner of the engravers' black etching ground. The plate, when cooled off, is ruled over by the diamond or other point of a correct ruling machine, using light pressure, to prevent the chipping off of the ground, and the flaking or breaking of the glass.

Upon the insertion of an edge guide or pattern, varying in profile from the mathematical line or straight edge of the ruling machine, and guiding the course of the diamond or other point, it will be obvious that any system of lines, from the straight line to the semicircle, with equal or varying intervals, can be traced with facility, and preserving the perfect parallelism required for the different spectra. Almost every style of line or figure used in line engraving may thus be obtained, vertical, horizontal, inclined, waved, barred, or dotted, and the figures between the lines may be of the same or varied characters, and of such degree of fineness or otherwise as the character of the work or the fancy of the user may require.

It has been said that the spectrum may be composed of a single plate of glass, that being sufficient to receive the lines and figures of the spectrum; but by preference another plate of glass is laid over the prepared face, to preserve it from damage.

The plate prepared to receive the engraving is coated first with a sensitive heliographic varnish. Upon this varnish the spectral image is produced by the light falling through the open spaces of the spectrum made as above described. The spectrum is thus imprinted upon the varnish previous to its receiving the photographic image by means of a second exposure to the light. Both images are thus blended into one, the spectrum giving texture to the photographic image. Then may follow the ordinary heliographic manipulations of developing the picture.

The photographic image being the last, and for a longer period exposed, overpowers the spectral image, but only so far as to preserve the delicate half-tints, the spectrum remaining sufficiently strong to serve as a means for holding the printer's ink when impressions are to be taken from the plate.

A CASE OF POISONING BY CYANIDE OF POTASSIUM.

BY OSCAR G. MASON.*

In every department of industry we find illustrations of that principle which leads men into danger through familiarity with situations and forces with which strangers would exercise their utmost caution, dreading the penalty which nature inflicts upon those who disregard her fixed laws; and in no department do we see this more clearly shown than in the laboratory. The chemist, who, from long association with the hidden dormant principles over which he holds, at best, but a limited control, is too apt to look with a sort of contempt upon the giants with whom he is ever warring, upon the unconquered domain of nature. He often seems to ignore caution in research, where he can have neither chart nor compass to guide him. The lessons which he learns from dear experience are too often forgotten.

Scarcely a month passes without bearing in its record the recital of misfortune resulting from a disregard of some well-known truth. A case in point recently came to the knowledge of the writer. One of the leading photographers in a neighbouring state is, at the present time, recovering from poisoning by the incautious use of cyanide of potassium. Like many others, he has for many years been in the constant practice of using it for fixing negatives and the removal of silver stains from the hands, thus forcing nature to absorb or drink in the poison, till she made her protest in a way which he could not have found very agreeable. In a recent letter he says:—

"I have not yet been able to resume my work in the chemical room. The last few weeks I have passed at the Springs, trying to extract the poison from my hands, which pain me so much that I have been obliged to keep them constantly in cold water. The first apparent effect of the poison was a feeling of numbness after using cyanide. This would soon pass away by a little friction in rubbing both hands together. I did not even then think of any further injurious effect. After some time this was followed by an eruption on the joints and between the fingers, accompanied by a constant itching sensation. This soon increased, until both hands were covered with watery blistering sores, and the itching pain became so intolerable that no words can describe the torture, which could ouly be borne by keeping both hands in cold water."

All this was not the result of ignorance, for the properties of cyanide in this case were well known. But how much more cautiously would it have been used in the hands of one less familiar with it, or knowing only that it was poison, and should be used with discretion. Its effects may be seen in nearly every instance where it has been used any considerable length of time. Nature has not so constituted our physical structure that the absorbents will not admit this strong alkaline solvent, or the delicate lining of mucous membrane prove indifferent to its attacks. It should never be used without great caution, and hyposulphite of soda, or other substitute, should be chosen whenever practicable.

A NEW OPALOTYPE PROCESS, AND A NEW DEVELOPER.

BY WILLIAM HADDOCK.*

Some time siuce I sent for this Journal an account of the use of a chloride collodion for negatives; and I now make another application of this chloride—for porcelain—that I wish you would try, and, if it suits, give it to the fraternity.

Ether	4 ounces
Alcohol	3 ,,
Gun cotton	40 grains
Nitrate of silver	32 ,,

Dissolve the silver salt in the water, and add to the collodion; then add the chloride, a few drops at a time, shaking until it becomes quite milky. Then add twenty-four grains of chloride of uranium, and eight grains of citric acid, dissolved in alcohol.

After coating the plate, and when dry, fume it, the same as paper, and you will find that it prints about as fast as paper, and is rich in tone.

I have an impression that it can be used for solar work in making large porcelain pictures. Why not?

For the preliminary coating I use the following:—

Albumen	1 ounce
Ammonia, concen.	2 drachms
Water	12 ounces

And, by the way, should you want to use this for negatives, put five grains of iodide of potassium in it, and you have a fine coating for negatives that will keep a long time, and will dry as hard as flint.

I see by the Journal that a quick developer is wanted. I believe the developer is one of the most important requisites of picture making.

I send you one, and also a print from a negative made with it. My aim has been to cheapen everything I use, and, at the same time, to get good results.

I am using twenty-five grains of silver to the ounce for my paper.

The print sent was made with twenty-five grains.

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* *American Journal of Photography.*

* *American Journal of Photography.*

The paper had A. S. B. brand. You will see that the albumen is not affected in the least.

No. 1.—Water...	... ...	1 quart
Sulphate of iron	... ...	4 ounces
Nitrate of patash	... ...	½ ounce.

Dissolve, and add pure cider vinegar 12 ounces, and 1 ounce sulphuric acid.

No. 2.—Water...	... ...	1 quart
White of two eggs ...	...	
Ammonia, concen.	... ...	4 drachms.

Shake up thoroughly, and mix with No. 1.

Give about half the time you generally do in the camera. You can push a negative as far as you want without fogging, and it comes out promptly.

In using it for Ambrotypes, I add a few grains of acetate of soda to four ounces of the solution, which takes out the free acid, and removes the tendency to metallic lustre.

It should be made about twenty-four hours before using it; then filter through cotton, six or eight ounces at a time.

NEGATIVE AND POSITIVE VARNISH.

BY LEIGHTON PINE.[*]

I take pleasure in sending you the following recipe for making a varnish which is the best I have ever used. The great objection to all self-drying varnishes is, that they are sure to peel off and crack after a while, while this one never does either. Another trouble with all the self-drying varnishes is this: that the ammonia used in them soon evaporates from a frequent opening of the bottle, and thus causes the varnish to dry without a particle of lustre; this is especially the case in flowing large plates, where a large surface of the undried varnish is exposed to the air. The self-drying varnish is less trouble, and will answer to use on a negative of little value; one from which you wish a dozen or two of prints, and never want to use again; but on a negative of any value—one which you care to preserve—a *self-drying* varnish should never be used.

The following is the formula for my varnish:—

Gum sandrac (picked)	... ...	1 pound
Gum shellac (refined bleached)	...	1 ,,
Alcohol (95 per cent.)	... ...	1 gallon.

Dissolve the gums in the alcohol by aid of a sand bath. After the gums have dissolved, allow the alcohol to become blood-warm on the sand, and then remove to settle; after which draw off the clear part by means of a syphon, and filter through paper; it is then ready for use. The plates must be warmed slightly before flowing the varnish, and then dried with heat. This varnish will never crack or peel, or injure the collodion film in any manner. It will not become soft in printing, and dries with a beautiful glossy surface.

The difficulties in making varnishes seem to be in settling, dissolving the gums, and in filtering. By using a sand bath all these troubles cease. The gums are dissolved quickly; the precipitate soon settles by continuing the heat after the gums are dissolved, and the filtering is then very easily accomplished. Our sand bath is made of a tin pan with a layer of sand about one inch thick, which we stand on top of a stove, or heat by means of a gas jet.

DR. WOODWARD'S PHOTOMICROGRAPHS.

The extraordinarily perfect enlargements of microscopic objects received from America by Dr. Maddox, which have been shown at various photographic meetings by Mr. How, have excited considerable interest. Brief notices of the mode of working in producing them only have hitherto been published. The following details, communicated by Dr. Woodward to our esteemed contemporary, the *Philadelphia Photographer*, will be read with interest.

The essential parts of the process are, the use of object-glasses, corrected so as to bring the chemical rays to a focus, and illumination by violet light. The steps are, briefly, as follows:—

The microscope is used in a dark room, the windows of which face to the south. Outside of one of these windows is a shelf, on which stands a Silberman's heliostat, so arranged as to reflect the direct rays of the sun upon the mirror of the microscope, which is fixed on an arm outside of the window, and, in its turn, reflects the sunlight through a short tube in the shutter. The microscope is placed at the inner extremity of this tube in a horizontal position, while at the outer end hangs a plate-glass cell, filled with a saturated solution of ammonio-sulphate of copper. Through this solution the sunlight must pass to enter the tube, and in so doing all but the violet ray is absorbed. Two steel rods, attached to the mirror, permit it to be adjusted without opening the window, and a black velvet hood thrown around the stage of the microscope prevents any leakage of light into the room from the space between the condenser and the objective of the instrument. With high powers, an ordinary achromatic condenser is used; or, in some cases, a pair of simple plano-convex lenses, with a large central stop, may be advantageously substituted to give greater obliquity to the illuminating pencil. Objectives properly corrected for illumination with violet light have been manufactured for the Museum by Mr. W. Wales, of Fort Lee, N. J., who has produced a three-inch, four-tenths, one-fifth, and one-eighth, the quality of which, in my opinion, is all that can be desired. The plate-holder, properly centred, slides on a horizontal walnut frame, by which it is held perpendicular to the axis of the microscope, and can be clamped at any distance not exceeding nine feet from the stage. By the side of this frame is a round rod, on the extremity of which, next to the microscope, is a grooved wheel. The milled head of the fine adjustment of the microscope is also grooved, and a silk cord over the two enables the operator to focus the microscope by means of the rod, no matter how far from the instrument the plate-holder may be.

To arrange the illumination, position of the object, &c., the operator stands by the microscope, puts in an eye-piece, and focusses in the usual way, adjusting the mirror by means of the steel rods. The violet light is readily borne by the eye, even when the whole power of the sun is employed in the illumination. This adjustment completed, the eye-piece is withdrawn, and, going to the plate-holder, the final adjustment is made by turning the rod. In this final focussing, the object is viewed with a focussing glass on a piece of plate-glass held in the plate-holder. The sensitive plate is then exposed in the usual way, the time required being from less than a second to twenty minutes, according to the power employed.

For low powers, the objective alone is relied on to give the necessary size. To obtain the highest powers, however, an achromatic concave is placed at the upper extremity of the microscope body. The one now employed gives a perfectly flat field, and increases the number of diameters between six and seven times. This concave is about half an inch in transverse diameter, and has an angle of aperture of 28°.

Many objects—as, for example, some of the tissues, certain diatoms, &c.—present interference lines when illuminated with a powerful pencil of parallel rays, and in order to prevent this false appearance, it is necessary to interpose a piece of ground-glass in the solar pencil to disperse the light: in this case, the time of exposure necessary is, of course, much increased.

By these contrivances we have been enabled to produce pictures of the utmost sharpness, and perfectly satisfactory in every other respect, with powers up to 2,500 diameters; and these pictures bear a further enlargement of from six to eight diameters in a copying camera. We have thus obtained excellent pictures with no less than 19,000 diameters.

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[*] *Humphrey's Journal.*

If the foregoing points are duly attended to, it matters comparatively little which of the very many excellent photographic processes in use for ordinary work is employed. As to collodion, many different samples have been used with good results—among others, for example, one containing two and a half grains each of the iodide of ammonium, the iodide of cadmium, and the bromide of ammonium, to the ounce of collodion. With the highest powers, a collodion containing two grains of bromide, and five of the iodide of magnesium to the ounce, has been found advantageous, the resulting nitrate of magnesia preventing the plate from drying during the long exposure necessary. The nitrate bath is used of the strength of forty grains to the ounce, and is acidulated with nitric acid. We use the ordinary iron developer, restrained by the gelatine solution, on the plan proposed by Brevet-Major W. Thomson in a recent number of your journal. The picture is fixed with hyposulphite of soda or cyanide of potassium, and afterwards intensified with iodide of mercury dissolved in a solution of iodide of potassium, and, when necessary, still further with Schlippe's salt. Great intensity is especially required in pictures of the diatomacea, and other lined objects. The negative is finally varnished, and prints taken on albumen-paper in the usual way. I send you samples of these prints. It is to be remarked, however, that for the Museum we prefer transparent positives on glass, mounted before a piece of ground-glass. A fac-simile of the field of the microscope is thus obtained. I should take pleasure in showing any of your readers who may visit the Museum the splendid series of specimens prepared by this method.

It may be remarked that, with the very highest powers—such as, for example, the new Powell and Lealand's one-fiftieth objective, one of which is in the possession of the Museum—the correction of the objective to suit the index of refraction of the violet ray is so small as to be practically unimportant. At least, by illuminating this lens with monochromatic light, we have obtained with it excellent photographs, one of which I send you. This remark, however, does not apply to the one-eighth, nor to any lower power. I have not yet experimented with the one-twelfth or one-sixteenth, but believe, also, that with these glasses the special correction will be found indispensable to the best results. I may also say, that with the one-eighth and the amplifier we have obtained photographs with magnifying powers as great as we have been able to obtain from the one-fiftieth. Comparative pictures taken from the same object give the preference, in some particulars, to the one-fiftieth; in some, to the one-eighth and amplifier.

The process I have above sketched is employed in the Museum in preparing the pathological illustrations for the medical history of the war, and diatoms, &c., have been employed by us simply as test-objects.

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THE TRUE PRINCIPLES OF PHOTOGRAPHIC REDUCTION.

BY G. MATHIOT.

M. Mathiot has charge of the Photographic Department in the United States Coast Survey at Washington. His communication is a letter to Mr. Carey Lea, published in the *Philadelphia Photographer*:—

In the United States Coast Survey Office, photography is used to reduce the field sheets to the publication scales. These photo-reductions have exceedingly fine lines, being generally reduced eight times in size, and have to be exact in size to one decimillimetre (0.0039 inch). You will, therefore, readily perceive the necessity of having the exact focus, or greatest "sharpness" on the plate, along with the position which gives the exact size, and also the difficulty of finding these two concurring points by focussing on the ground glass. I almost wore my eyes out by focussing by inspection, and was driven to seek for a formula for finding the focal distances by calculation, and tried everything given in the works on optics without success, until it occurred to me to make the measurements from the focal centres, instead of the optical centres. Since then, we have had no difficulty in making a reduced copy of a map, to any required degree of exactitude, and instead of the numerous trials for finding the required size, a short calculation alone has to be made. No ground glass is used; in fact, there is no such thing about the camera, it having got broken into fragments some years ago, and having before fallen into disuse.

We use a 16-inch globe here for making our reductions, and I find the difference in the equivalent foci, as indicated by measuring from the focal centre and from the optical centre, to be very considerable. When the camera is placed so as to make a copy of the exact size of the drawing, the distance from the drawing to the plate (or place of the ground glass) is 1.977 metres (6 ft. 5.83 in.), consequently the equivalent focus by the optical centre is 0.494 metres (19.44 inches). And to make a copy one-eighth the size of the drawing, the camera has to be moved 3.458 metres (11 ft. 4.14 in.) further off, supposing this determination of the focus to be correct. But experience shows this position is far from the size and focus too, and that the true position is 3.532 metres (2.91 inches more). And as the unquestionable law of the relation of the conjugate foci $\left(\frac{1}{v}=\frac{1}{f}-\frac{1}{u}\right)$ requires that the real focal length is one-seventh of the increased distance between the position which gives the size 1-1 and 1-8, therefore the true focal length is 0.5046 metre (5.417 in. more).

I measured the focal length by the following method, which also proved that the determination from the optical centre was wrong. The camera was set on a distant landcape, with the smallest aperture open, and 100 thin pictures on glass were made, each at different distances from the lens. These were compared for sharpness by inspection under a microscope, and measured in size by the micrometer. The result was, that the successive pictures in size were formed in a cone which had the apex at 0.5032 metre (19.81 in.) distant from the best defined picture.

But the latter determination (0.5032 metre) differs from the former (0.5046 metre). They are both correct, however; the latter for the image side of the lens, and the former for the object side. *Practically*, at least, I find the two foci are not the same. The shortening on the image side *may* (?) be caused by the spherical aberration of the lens; for, with the largest aperture, I find the focus on the image side only *about* 0.5007 metre, and it may be, that theoretically the *very central* rays have the same focal length on each side; but the discrimination is indispensable for a nice use of the lens.

I fix the focal lengths and focal centres by the following method: First, set the camera, on a very remote object, and get the best possible definition. Then mark the place of the shield by a scratch across the edges of the base board and side of the shield, or the back of the camera, which carries the shield. Now set the camera to make a copy of a drawing of its exact size and best possible definition. It now follows that the distance the shield has been moved out from the lens, as indicated by the notches made on the shield and base board, is the focal length for the image side. Twice this distance laid off from the plate (or place of the ground glass) to the side of the mounting of the lens gives the plane of the focal centre for the image side of the lens, and this should be marked by a line on the mounting. Next mark the new position of the mark on the shield, on the base-board, divide the distance between the two marks on the base-board in the middle, and bring back the shield-carrier till the notch on the shield cuts this middle mark; the shield is now in position for making a photograph of exactly *half* the size of the drawing. Now mark the distance of the camera from the drawing on a rod, by making a mark across the rod and some part of the camera, and move the camera off from the drawing till the image is exactly one half its size. Measure the distance the camera has been moved out as indicated by the mark made across the rod and on the camera. This distance is the focal length of the lens for the object side of the lens, or combination of lenses. Three times this latter distance laid off from the drawing to the mounting of the lens marks the plane of the focal centre for the object side of the lens. And a mark made here is the true place from which all measurements should be made for setting the camera. These determinations should be verified by taking other distances from the drawing for reductions to one-fourth, or one-tenth, if practicable, *and each aperture must have its own determinations.*

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A SUBSTITUTE FOR THE ORDINARY NITRATE BATH.

BY CHARLES A. SEELY.*

The nitrate bath is one of the most serious troubles of the photographic establishment. It is very costly to begin with, is all the time at the risk of accidents, and gets out of order of itself, in spite of us. By reason of upsetting, drippings from plates, adhering to the backs of plates, where it is not wanted, and losings in the frequent rectifications, no more than one-fourth of it is practically available. And then how annoying when it is out of order. The evils of the bath as yet seem to be necessary and unmitigated, for none of the praiseworthy attempts to abolish it, or to modify its use, have been successful. I am one of those who have failed; but as I proceeded on a somewhat different theory from others, and as I almost attained success, I think my attempt is worthy of record.

This paper may prevent some others from trying the experiment in the same was, or may inspire another to discover the element of perfect success, which I omitted.

The plan I followed was briefly this:—I took plain collodion, and in it I kept in suspension a haloid salt of silver, sufficient in amount to give a creamy film. The plate was coated with this collodion in the usual way, and when the film was set, I dipped the plate in clean water, or put it under the tap, till the greasiness had disappeared. Next, from a bottle, I poured on the plate a solution of nitrate of silver, when I was ready for the exposure and succeeding ordinary operations. Some of the advantages of the plan are, that the silver is used only on one side of the plate; that only a small quantity of silver solution need be made up at a time (a few ounces will do a day's work); that the silver solution and collodion are always in order and unvariable, &c. The saving of silver, the shortening of the labour, and the regularity of effects which the process secures, are things well worth while.

I made many experiments, with the view of getting the best method of making an iodide, &c., to remain in suspension, and to determine the best preparation and combination of silver salt. I tried iodide, bromide, and chloride of silver, and various combinations of them. I also tried various ways of precipitating the silver salts, in the collodion, and independent of it.

In some respects my experiments were more successful than I had anticipated. The manipulations were very simple, and the economy of silver was very apparent. Moreover, what most people would consider especially encouraging, the process would produce the very best negatives; no complaint could be made of the quality of the results.

But the process, as I have above intimated, was a failure. This failure was of a sort that I did not anticipate, and for which I have as yet found no remedy; the reason of the failure is not apparent. The time of exposure required for the process is two or three times that of the ordinary process. Let a remedy for this difficulty be found, and it is my opinion that the process will be adopted for portraiture. In the meantime it is well worthy the attention of amateurs and others who are producing landscape views.

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Proceedings of Societies.

North London Photographic Association.

The first Meeting of the Winter Session of this Association was held in Myddelton Hall on the evening of Wednesday, October 3rd, Mr. G. Wharton Simpson in the chair.

The minutes of a preceding meeting were read and confirmed, and the following gentlemen duly elected members of the Association:—Messrs. Fuller, Gale, Binney, and Elkington.

The Chairman regretted that they were not provided with any paper for this, their first meeting. He had the gratifying duty, however, of informing the members that the presentation print was ready, and of congratulating them on its interest and beauty. It consisted of a subject picture by Mr. Robinson. Regarding its pictorial and photographic merits he would not attempt to make any remark, as members would form their own opinions on this subject. He might, however, point out that it possessed one or two features of interest as illustrating phases of progress in their art. It was the first example of carbon printing which had been issued in numbers. They had all seen and admired isolated specimens of Mr. Swan's work; but here they saw the results of the process in practical operation; and he might mention, that of the hundred copies required for the members, the uniformity of excellence was so complete he believed it would be difficult to select one copy better than another. He thought that the members would agree with him that in all respects the results were at least as beautiful as silver prints, whilst they possessed the advantage of absolute permanency. This picture possessed another interest, inasmuch as it was one of the first examples of the work of a new lens recently introduced with the express view of securing a soft and diffused definition, instead of cutting sharpness on one plane only.

A general conversation on the carbon process followed, in the course of which the Chairman detailed the present mode of working the process in Messrs. Mawson and Swan's printing establishment, and explained, in answer to Mr. Foxlee, that there was no danger of the image cracking or perishing in any way.

Mr. Shave proposed, and Mr. Foxlee seconded, a vote of thanks to Messrs. Mawson and Swan and to Mr. Robinson for their liberality in placing such a valuable picture within the reach of the Society as a presentation print.

The Chairman, in putting the motion, which was carried by acclamation, stated that both as regarded Mr. Robinson and Messrs. Mawson and Swan, the matter had been chiefly a labour of love, as the price charged was altogether inadequate to the value of the picture.

Mr. Taylor exhibited Mr. Claudet's diaphragm, capable of being expanded and contracted during exposure.

Mr. Allen remarked that it was very ingenious, but it was imperfect in not having an index, and he feared that the india-rubber would not stand the great heat of the sun without alteration.

The Chairman said that, being made of vulcanized india-rubber, it would stand any heat, without alteration, short of that at which it was vulcanized, which was, he believed, about 300° Fah.

Mr. Taylor said it was intended to supply it with an index.

After some further general conversation, the proceedings terminated.

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Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 10th October, 1866.

In a paper presented by M. Chevreul to the Academy of Sciences on the 23rd October, 1865, M. Niepce St. Victor mentioned four processes for obtaining blacks in heliochromy. In a communication just made to the same Academy, M. Niepce has recurred to this interesting subject.

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* Read before the American Photographical Society, May, 1866

He especially treated of the first of the four processes indicated by himself, as that was the only one which allowed him to obtain blacks at the same with all the other colours.

After having chloridized the silver plate, it is plunged in a bath containing 50 centigrammes of alcoholized soda to 100 grammes of water, and to this a small quantity of chloride of sodium is added. Raise the temperature of the bath to about 60 deg. (centigrade), and leave the plate in it for a few seconds only stirring the liquid all the while. On withdrawing the plate from the bath, rinse it with abundance of water, then proceed to the annealing, which in this case ought to produce on the plate a bluish violet tint, probably caused by a partial reduction of the chloride of silver. Next cover the plate with a varnish of dextrine and chloride of lead, as indicated by the author in a preceding paper. By these means, the operator will obtain all the colours, with whites and blacks more or less intense, according to the preparation of the plate and the nature of the blacks.

It is indispensable to take care that the reduction of the chloride of silver be not carried too far, because then nothing but whites and blacks would be obtained, without colours. It is with a view to prevent this too great reduction that a little chloride of sodium is added to the soda bath; or else a few drops of ammonia.

At M. Chevreul's request, M. Niepce endeavoured to photograph a hole (*tron*), but the result was negatived.

He called attention to the following experiment as showing the activity of the *blacks*.

He reproduced by contact a coloured engraving representing a French guardsman. The different colours of the uniform were produced. The black hat, as well as one of the gaiters (the other having been cut out and replaced by white paper), impressed the plate in a very perceptible manner, giving a tint, darker or lighter, according to the preparation of the plate. The part cut away gave a white.

Blacks far more intense may be obtained by previously reducing the coat of chloride of silver by the action of light. Then the blacks are produced, naturally, by the tint of the plates; but all the colours are less vivid than those obtained by the process above described.

The chloride of silver may be reduced in the following manner:—

After chloridizing the plate, cover it with the dextrine and chloride of lead varnish. Expose it to the light before annealing. After an exposure of five to ten minutes in diffused light, anneal it, and the plate will assume a violet hue, more or less dark, according to the time allowed.

M. Niepce next notices a twofold action of the light and heat on the chloride of silver, by means of which extraordinary relief is acquired. He proceeds thus:—

After chloridizing the silver plate and passing it through the soda bath without annealing, he covers it with the dextrine and chloride of lead varnish.

He next applies on the sensitized coat a chromolithograph on varnished paper, or a simple coloured engraving, and then exposes the plate to the sun for eight or ten minutes, after which the cliché is removed, and the annealing performed.

Under the influence of heat, the blue and red tints especially are very intense. The cliché is again placed on the proof and exposed to the light for some time; under its action the colours are produced and the relief is obtained.

The plate is again warmed, to give fixity to the colours, and in these conditions the reds persist a very long time in the light; the yellows and blues are the first to disappear.

This relief-effect is also produced in the camera, but not on the chloridized plate, if it be not covered with the dextrine and chloride of lead varnish.

If the coat of dextrine be removed from a proof in relief, the relief remains and is as perceptible as before. The same is observed if the chloride of silver be dissolved by ammonia.

The following are the observations made by M. Niepce on the sensitiveness of the coat of chloride of silver. When the chloride of silver is reduced, either by soda or light, it is less sensitive after the action of annealing than that which has not been reduced.

If, with a yellow glass, coloured with the oxide of uranium, you cover one half of a plate ready to receive the impression of colours, you will obtain an impression far more rapidly in the portion under the uranium glass than under a white glass of the same thickness. The thicker the uranium glass, the more rapid the effect; but the yellow of the glass injures the colours, and its use is, therefore, inadmissible.

If a varnish be added, having chloride of lead and a certain quantity of chloride or azotate of uranium for its base, the impression of the colours will be accelerated, but they will be less durable.

To conclude: in certain conditions the blacks have an activity peculiar to them; they will impress a sensitized plate just as colour does.

The *Moniteur Universel* published, on the 4th October, the list of French photographers and manufacturers admitted to the Exhibition. They are 165 in number. The space allotted to them is 296 square metres. The proofs intended for exhibition must be sent in before the 15th of November next. The delegates approved by the Imperial Commision are, Messrs. de Berenger, Frank de Villecholle, Ernest Lacan, Marion, Davanne, Paul Gaillard, Bayard, and Victor Nine. Ernest Lacan.

Talk in the Studio.

Photographers' Provident Fund.—We hope now that the approach of the winter season will afford more time to photographers, the subject of a Photographers' Provident Fund will be carefully considered, and steps taken to put the matter in motion. We are glad to see that a contemporary has recently endorsed our suggestion as to its importance, and urged the matter on the attention of its readers. Cases are continually occurring, illustrating its necessity, and if we were to yield to requests made, our pages would be scarcely a week free from some specific appeal for relief for some individual case of suffering. We have long felt, however, that the pages of a scientific journal were not legitimately devoted to appeals for private aid for private cases, and that we had no right to intrude such appeals upon our readers; we have had, therefore, with much pain, to decline the insertion of such applications for aid. An established fund, properly administered, is required, and we hope will ere long be in existence. *Apropos* of the subject, we may here take occasion to acknowledge the receipt of half-a-sovereign, sent from Mr. J. W. Baldwin, for Mr. James, a photographer to whose loss of sight we referred in our last.

Cabinet Portraits.—Mr. J. Carbutt, of Chicago, an able English photographer, practising extensively in America, from whose pen our readers have frequently had valuable suggestions, says:—"A few weeks since I contracted with the leading publishing house here to illustrate a biographical sketch of the leading men of Chicago, with portraits of the men. The size I had decided on was between the carte-de-visite and *our* half-plate, but on seeing you advocate so strongly the new cabinet, I made sample of that style, and liked it so well I induced the publishers to alter the size of their book to suit the new 'cabinet.' They have done so, and I shall thus be able to give the new style a pretty good introduction in the West. Something new is needed to revive the business in plain photographs, for, what with bad weather and the falling off of the demand for cartes de visite, this has been the dullest summer in five years."

The Effect of Boiling Baths.—A correspondent says:—"As a subscriber to your Journal, and an amateur photographer, I may be allowed to suggest the experience I have gained from boiling a bath that has been long in use. An alkaline bath becomes more acid, the ether that has accumulated is evaporated, and the exposure of the plate, requiring a longer time, produces a clearer, better defined picture. This applies more particularly to architecture and landscape photography. It is not necessary that the whole of the bath should be boiled, say one-third, and passing through the filter heats that portion left sufficiently to evaporate the ether. The accumulation of ether causes a thickness of the film, which is not favourable to the clearness of the photograph; but, at the same time, I consider ether has a tendency to sensitiveness, when in right proportions."

Photography at Balmoral.—Messrs. W. and T. Downey, of Newcastle-on-Tyne, have recently been executing a photographic commission for Her Majesty, which has kept them engaged for a month, in photographing Balmoral and the neighbourhood. They have also taken various portraits and groups of the Queen and Royal Family, and of members of the Court.

Albums for Cabinet Portraits.—We have pleasure in noting that Mr. Elisha Mander, of Birmingham, is aiding in the impulse to cabinet portraiture by issuing a handsome album for these portraits at a very moderate price. A specimen before us, massive, neat, and elegant in binding, for fifty portraits, can be forwarded, we are informed, carriage paid, to photographers who send cash in advance, for 13s. 6d. We step out of our course to notice this matter of price, because we believe it important to aiding the establishment of the album portrait, and thus giving a new impulse to portraiture.

Ingenious Application of Photography.—Photographic processes have been brought to such perfection as that pictures are now easily obtained which represent the projectile issuing from the mouth of the gun, and the latter so sharp in its details that the image must have been produced before the recoil has begun. To effect this, it is evident that two things are indispensable—the collodion must be so sensitive as to require but an instant of exposure; and the latter must take place precisely as the gun is fired, and must last during the combustion of the powder. No amount of human adroitness could secure the fulfilment of the last condition; but it is nevertheless effected, and by very simple means. The charge is ignited by the galvanic battery, and the very current that heats the platinum wire which is within the fuse, so as to make it hot enough to set fire to the powder, brings into action an electro-magnet that lifts a disc, which is in front of the lens, and, as long as the current is passing, keeps it up, but lets it fall as soon as the platinum wire is melted, battery communication being then at an end.—*Scientific Review.*

Single Cameo Portraits.—We have received from a correspondent in Havannah, Senor Mestre Aulet, a very pretty specimen of portraiture, consisting of a single oval medallion, mounted on an embossed visiting card with perforated edge, and embossing surrounding the oval. The portrait is made convex by punching, after the fashion introduced in the diamond cameos, and the effect is altogether very pretty. The photography is exceedingly excellent.

To Correspondents.

T. J.—The spot on the face in the print sent us is a metallic spot in the paper. 2. Spots which gradually appear after a negative has been printed, between the film and glass, are due to some particle of matter which has originally been on the glass, which has not produced a perceptible spot or stain on coming in contact with the silver salts at first, but which darkens on exposure to light. 3. Negatives should be kept in a dry place. 4. On the whole the picture is good. The lighting might be managed so as to secure a little more relief and modelling, and the negative might have been better for a very little less intensifying.

Opal.—It sometimes happens that when collodio-chloride of silver, containing much excess of free nitrate, is long kept, a decomposition is set up by the action of the free nitrate on the soluble cotton, which produces a film very ready to split up. We have also noticed that when the plate is kept coated with such collodio-chloride for many hours, such a film readily splits. The best plan is to make the collodio-chloride as described in our last Year-Book, sufficient for a few weeks' use, at one time. 2. We prefer to coat the plate a short time before use, and when the film is set, dry thoroughly before a fire, and then expose as soon as it is cool. This is better than keeping the plate a few hours to get thoroughly dry. By long keeping, there is at times a tendency in the film to become moist again, from the free nitrate absorbing moisture. We do not like the use of any preliminary coating. 3. As a rule, we prefer the pictures unvarnished, unless they are to be coloured with powder colours, in which case the alabastrine varnish aids in securing a good result. If the uncoloured picture be varnished, a clear, even coating of a spirit varnish answers well, and requires heat, of course, in applying. Roughing the edges of the plate is an aid to preserving the film; but we have found that an edging of albumen applied before coating, or an edging of wax after coating, always prevents loss of films.

R. R. Taylor.—Diluting your bath will be most likely to rid you of the markings described. The use of a plate a size larger than is required is often useful when you are troubled as you describe. The image cannot be taken upright without further optical arrangements, which would lengthen exposure. Enlarging the aperture during a part of the exposure has often been found valuable.

A. Z. A.—The accounts we hear of the lenses you name are very variable, and lead us to conclude that they are not of uniform character. That of 6½ focus you mention will not, we think, be likely to give good results for cabinet portraits. The focus is too short to cover satisfactorily. Mr. Mander, of Birmingham, makes an album for cabinet portraits at a cheaper rate. The price is about 13s. 6d., we believe. We will consider your suggestion as to the Year-Book.

An Amateur.—The only mode of obtaining a dead flat surface to the background screen is to paint it either in distemper or oil flatting. The former consists in the use of colouring matter in water, with sufficient size to make it bind; the latter consists in the use of oil paint containing the least possible proportion of oil, turpentine being used instead.

J. P. Hubbard.—The letter has been forwarded to Mr. Woodbury, and the copy of the paper you require forwarded.

H. R. (Amateur, Chelsea).—An old collodion bath may be strengthened and employed for printing; but it does not generally yield such perfect results as a bath which has not been so employed. A bath which has been used for exciting collodion plates generally contains an accumulation of materials of an uncertain character. There is generally ether, alcohol, iodide of silver, bromide of silver, nitrate of cadmium, ammonia, potash, &c. These, and often other products, are present in uncertain quantity, and cannot be entirely removed by evaporation or precipitation. To what extent and in what manner these contaminations affect the printing is uncertain, and the results are uncertain and variable.

J. Schofield.—The tone of the print you enclose is that generally produced by an acetate toning bath, and many persons prefer it to a deeper or blacker tint. If you wish for a blacker tone, it is probable that a lime bath would suit you better. As a general rule, especially with *Rive* papers, the print becomes warmer or browner in tone on immersion in the hypo bath. The use of a lime bath, or of *Saxe* paper, and toning a little deeper, will enable you to get blacker tones. It is a good plan in toning to look through the print to ascertain its depth. It often happens that a print which looks black by reflected light when toning, will be found to look brown by transmitted light, in which case it will generally become brown in the hypo; but if it be toned until it have a black tone by transmitted light, the finished print will be found to be black. 2. The shadow on the retiring cheek is perhaps a little too deep for some tastes. The use of a white reflecting screen will enable you to modify it. The print is pretty good. A little more exposure of the negative would have improved it. 3. The comets you describe are generally due to the use of collodion too recently iodized, or to the use of too little bromide. The pin-holes may be due at times to the same cause, or to a variety of causes in the condition of the bath. Read the various articles on the causes of pin-holes. They are too numerous and would require too much space to recapitulate here.

Puzzled.—The metallic-looking fog between the film and glass is due to the use of a damp or dirty plate. There is an imperceptible film of matter on the glass plate you believe to be clean, which, combining with the silver salt with which it comes into contact, is reduced by the developer into the metallic foggy deposit on the glass. Sometimes a bad sample of glass will cause it, no amount of cleaning securing perfect immunity; sometimes the use of glasses that have been employed for negatives before. The use of nitric acid for cleaning the plates will sometimes act as a safeguard.

An Anxious Beginner.—The proportion of iron in your developer is really the all-important point, and that you omit to state. It is certain, however, that if you require five minutes to bring out an image, something is wrong. It may be the fault of the developer. Try a 15 or 20-grain solution, with 15 minims of acetic acid to an ounce of water. Under-exposure will cause slow development. The bath out of order, or the collodion very old and insensitive, will conduce to the same end. The collodion you name, if not more than a few months' old, ought to be good.

T. H. (Horsham).—The print appears perfectly good. Plain paper prints are not so liable to fade as albumenized prints. The lac varnish doubtless tended to preserve the print.

Ut Supra.—As a general rule, there is quite as much difference in the qualities of the lenses of the makers you name, as in their prices. We prefer those of either of the first mentioned makers. The mere fact of a lens being mentioned in any catalogue as covering a certain sized plate is no criterion of the size or capacity of the lens. It will often happen that the lens quoted as for half-plates by the best makers, will cover a whole-plate better than the lens catalogued as a whole-plate lens by an inferior maker. The costliness of a lens depends on a variety of things. In the first place, the diameter of the lenses materially affects the question: the larger the disc of perfect optical glass the more costly it is, not only because of the value of the glass, but of the greater difficulty in getting it free from imperfection. Again, the larger it is, the more risks there are in working it correctly; and the larger the lens, the more care it requires to secure the necessary corrections. It is much more difficult and costly, therefore, to make a large lens to work correctly with large aperture, and therefore rapidly, than a small one. These and many other causes affect prices, and, as a rule, prices indicate quality and certainty. The reason why the new lens you mention for 10 by 8 can be made for £15, whilst a whole-plate lens by the same maker cost more than double, is, not that the new one is a worse lens, but it is less costly in construction. As a matter of trade policy, it probably might be considered by many to be very unwise to have introduced the new lens, for it is very likely to supersede those double in price. On the whole we should prefer the new one if it were the same price as the more costly one, as we prefer its performance. The only point in which we think it inferior to the old one consists in its being a little less rapid.

A. W. Hosmer.—Thanks for the information. May we make use of any of the facts?

J. C. (Chicago).—What is termed in this country "crystal varnish," which is a solution of gum dammar in benzole with white bees'-wax added, makes a very good dead semi-opaque varnish for transparencies.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHIC ENAMELS AND THE MAGNESIUM LIGHT.

We were recently indebted to Mr. Joubert for a sight of the interesting operations in photographic enamelling, from the first step, consisting of the printing of the image in ceramic colours, to the last, in which the image is "burnt," or vitrified in the muffle furnace. We have on more than one occasion regretted that the art of producing photographic enamel miniatures, like those which have brought so much fame and profit to M. Lafon de Camarsac, in Paris, has received so little attention in this country, and that it was necessary to send out of the country, for execution, all orders for indestructible photographs in ceramic colours. We have regretted this from no narrow feeling of national jealousy. We have admired the enamels of M. Lafon very much, have given him all credit for their excellence, and have rejoiced to hear of his success. But it has appeared matter for regret, whilst a skilful photographic enameller in Paris was overpressed with work, that in this country the art was wholly neglected. Mr. Joubert was the patentee of a process of photographic enamelling; but he had only applied it to the production of large transparencies on glass for decorative purposes. Until recently he had scarcely tested its fitness for the production of delicate miniatures, and that branch of his patent remained in comparative abeyance. We are glad to state that this is so no longer. Mr. Joubert has been devoting attention to the working out of the conditions necessary in producing miniatures with great success.

Until recently a serious barrier to the successful prosecution of these experiments stood in the way,—the extreme uncertainty of the light in this country. In printing the image it is of great importance to secure the right exposure, and it is impossible to examine the progress of printing. Hence the proper amount of exposure could only be ascertained by experiment; and as Mr. Joubert's engagements did not permit a sole devotion to the matter, but little progress was made. In his recent operations he has completely got rid of this difficulty by abandoning the use of daylight for printing altogether. He now prints the image by means of the magnesium light: the exposure has ceased to be a question of time, and become one of weight or measure. So much light, consisting of so many grains or inches of magnesium ribbon, is weighed or measured out, and burnt with unvariable accuracy of result. The cost of the light for each enamel is about one penny, for which absolute certainty as to the depth of printing is secured. Nor is certainty the only advantage; singularly enough, there is a great gain in excellence of result. Another difficulty which attended the few experiments which Mr. Joubert had formerly made in producing enamel miniatures, was the tendency to excess of contrast. The magnesium light changes all this; like sunlight printing, but in still greater degree, it possesses great penetrative power, rapidly passing through the dense portions of the cliche, and producing great softness and harmony. A cliche which, by daylight printing, would have given a hard picture, with black shadows, and no detail in the lights, yields, when printed by the magnesium light, a soft, round, delicate picture. Thus it will be seen that two of the most valuable qualities, certainty and excellence, are gained by the use of the magnesium light in a process which pre-eminently needed such aids to secure its full value.

We will now briefly sketch the operation of enamelling. The cliche used is a transparent positive, which should be delicate and full of finely defined detail as possible. To commence operations, a plate of glass is coated with plain collodion. This, when dry, is coated with the preparation described in the specification of Mr. Joubert's patent, consisting of honey and albumen, each three parts; saturated solution of bichromate of ammonia, five parts; water twenty parts. This is dried for a few minutes over a gas stove, until the surface is in a right condition for printing. It is then placed in a pressure frame, in contact with the transparent positive, and placed about six inches distant from the flame of the magnesium ribbon, which is burnt in one of Solomon's lamps. Of the very thin ribbon in use, from three to four feet, according to the density of the cliche, were required to print sufficiently deeply. and for each plate it was simply necessary to measure off the length of ribbon, and burn it to secure the certain result. On examining the plate, a faint brown negative image on the yellow ground was seen. The ceramic colour, in powder, being applied with a soft camel's-hair brush, adheres only to those parts which have been protected from the light, and which, therefore, remain tacky. Those parts upon which light has acted are rendered hard and insoluble, and possess no tackiness, and, consequently, no colour adheres to them. The singular part of the matter is that, contrary to the theory of carbon printing, in which it is supposed that the action of light, commencing on the surface, should render a thin superficial film uniformly insoluble at once, the effect of light here appears to be to render the portions where the action is most intense quite insoluble, and those parts partially protected, partially insoluble. The colour, therefore, adheres freely to the entirely protected parts, which are very tacky, and forms deep blacks; and to the partially protected parts it adheres in exactly gradation of the half-tones of the cliche, forming an image with the perfect gradation and roundness of the original.

When sufficient of the vitreous colour has been applied—and we may remark in passing, that the amount of colour applied to different parts being somewhat under the control of the manipulator, gives him a power to modify the pictorial character of the image—it is treated with alcohol containing a few drops of nitric acid; after which it is plentifully washed with water, to remove the chromic salts as far as possible, and then suffered to dry. The next operation consists in transferring this image, by lifting the collodion film on which it rests, to the convex tablet of white enamel of which it has to be burnt. The collodion film which is uppermost must now be removed by dissolving it, otherwise its combustion and possible explosion in the muffle would probably cause the disintegration of the image. The operation of burning follows; this, with the muffle properly heated to commence with. is effected in a few minutes, and requires for its proper management, of course, experience and judgment, not difficult, however, to acquire. What surprised us was the simplicity and brevity of all the operations. Dovetailing the processes properly so as to have a number of plates ready at one time for each different manipulation, it appeared to us that the operation of producing an indestructible photograph, duly burnt-in in ceramic colours, was actually more rapidly completed, with proper facilities at hand, than the ordinary process of producing a silver print. Having regard to the beauty of these pictures, as well as their undoubted stability, and their suitability for many purposes, we cannot help thinking that this is a branch of our art that is well worth more attention than it has yet received.

Of course these photographs can be coloured with enamel colours and again burnt-in, producing, when well managed, the most perfect and beautiful of all forms of minute portraiture.

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SNAKES AMONGST THE CHEMICALS—METALLIC SILVER STAINS IN THE NEGATIVE.

We recently printed an article by Mr. Carey Lea, in which he quoted Professor Towler as entertaining the opinion that metallic silver stains were frequently caused by the unsuitability of the developer. Dr. Anthony subsequently pointed out that the evil in question was chiefly caused by the presence of scum on the surface of the nitrate bath. Singularly enough, on the same day on which we received Dr. Anthony's communication, Professor Towler published in the journal of which he is the accomplished editor, an article describing his discovery of the actual cause of these "flashes of lightning," &c, as he calls them, as being precisely that which Dr. Anthony points out. The details will be found in the following amusing narrative. It is not often, we apprehend, that photographers are visited by snakes during their operations; but we remember Mr. England describing an incident of a similar kind. Whilst photographing in America he found a large snake rearing its head with open mouth just outside his tent. The cyanide solution being close at hand, a little of it was poured between the gaping jaws of the snake, his fate being less fortunate than that of those for which Professor Towler found a better berth than the photographer's water bucket. We now quote the article:—

On Thursday and Friday we, that is, Landscape Photographer, and Photographer's Assistant, had been taking views from the early morning to sun-down without the slightest cessation, excepting now and then to ascertain if the brandy-developer was all in order, a matter of great importance where you had to descend and ascend a ladder five hundred feet in length with a burden in either hand and the photographic tent on your shoulder, and besides this, to do more physical labour in one day than any other man, excepting a healthy and muscular enthusiast, could perform in a week, we maintain that this sort of developer is not only important but absolutely a *sine qua non*, an absolute necessity; this developer brings out the shadows most beautifully, and prevents the deposition of moisture on the plate. The only disadvantage which it possesses, is its tendency to produce *fogging*; but this results only when extremely large doses are used (an ounce at a time being a sufficient dose for a stereoscopic plate; if you exceed this quantity you run the risk of clouding your films; therefore keep within bounds). It had been raining at frequent intervals on Thursday, still we had accomplished a good deal of work; we concluded, however, to leave our paraphernalia, with the exception of our lenses, over night under the brushwood that grew out from a precipice. Bottles and vials, etc., were packed in the pail, which was finally covered with the focussing cloth and a towel. The tent, pail, etc., were covered with care, but with apparent carelessness, with branches of trees, so that nothing of our art apparatus was or could be visible to any one strolling in this direction. But, like the Austrian General-in-Chief, we had made our calculations in accordance with known and acknowledged modes of warfare—we had not dreamt of the needle-gun, much less of irregular marauders. The next morning, when we visited the grounds again, and had removed the branches from our photographic property, the sun was shining brightly and had begun to dissipate the fogs that hung over the stream as it meandered through the ravine. All appeared undisturbed. But what was our horror when the towel was removed from the top of the pail! Two respectable snakes raised their heads rampant from their coils, and regarded us evidently as intruders upon their new domains. In beautiful coils there were seven other snakes, smaller in size, and, as we judged, the hopeful family of the two elder and larger specimens. These nine snakes had taken possession of our large flannel focussing cloth, and appropriated it as their future nest; no doubt that they found it warm and comfortable, and deemed themselves as much entitled to it as filibusters do to Mexico. After the horror of their sudden detection had subsided, our first inspiration was to destroy this nest of vermin, and we were preparing a switch for the purpose. The sun shone upon the brood; the little ones raised themselves erect, and their little eyes sparkled as they raised their tiny heads, and all nine—the father, the mother, and the seven infants—seemed to stand on a coil and drank in the warmth and the glow of the glorious sunbeam. They seemed to say, at least we thought they did say: "Why will you kill us? The same Almighty, that made you and all your children, made us; we have done you no harm, and can do you no harm; let us live to enjoy conjointly the glory of the Father in the silver rays of the rising sun." On examination we found that they were harmless reptiles, and we could not find in our hearts to deprive this little family of the pleasure of praising the Creator for the effulgence that gave both them and us such unspeakable gratification. We soon emptied the focussing cloth of its contents into the cavity of an old rotten tree, and then occurred to our thoughts: "Perhaps the little rascals had been at our developer and were a little boosey." We proceeded at once to examine the bottle, no not the bottle, but the cork; the latter was all right, there was no perforation. "Bless the Lord!" came involuntarily from our lips; we felt relieved.

This was Friday; towards noon it began to rain; but we continued our hard labour till half-past five, when it became absolutely necessary to abandon the photographic art; for, in spite of all our developers, it was impossible to get another impression. We were at some distance from our hotel as well as from the location we had left in the morning; and our traps were again deposited, as during the preceding night, under shelter. Relying on the law of probabilities we had no fear of finding a nest of snakes in the pail the next morning. The morning came; it was a damp and chilly morning; rain drops and fog drops hung on every leaf, crouched together as it were to keep themselves warm. The tent was dripping with moisture; the towel and the focussing cloth were quite damp; and we felt chilled and damp ourselves. The developer brought no relief; but we prepared for the day and pitched our tent. As we proceeded to coat a plate with collodion we found that light entered in a large volume from some unseen avenue, which turned out to be a round aperture more than an inch in diameter, which some rodent had gnawed through the carriage cloth during the past night in order to be enabled to reconnoiter the grounds within. Having neither needle, thread, pins, nor cloth on hand, we stuck a thick peg through the hole and started on our labour again. The glass plate was by this time completely suffused with moisture; again we were interrupted. The surfaces of the plate being thoroughly wiped, dried, and polished, we hoped all would now proceed in order. How chilly the collodion felt! The collodionized plate was immersed, and in a minute or two it was examined—how blue it looked. It was left in the solution at least five minutes, and the film was still blue; but we determined to expose the plate anyhow. The picture came out, with a long exposure, all right enough, but on one end of the plate there were a number of silver specks of various shapes, which we attributed to the carelessness of our assistant whilst carrying the plate. One end, or half of the picture was good, and we preserved it, and prepared another plate, and gave very broad hints to our assistant to be very careful this time how he carried the plate. The impression came out splendidly, but there were lots of specs this time, flashes of lightning, thunderbolts, fortifications, turrets, and salient angles—if we could only have sworn it would have relieved our pectoral inflation—another half plate was preserved, and we tried again, with the same result. The plate-holder was now carefully examined, and all drippings were removed; and another view was selected, and we carried the plate ourselves; but it was all in vain; the result was the same as before. "Donnerwetter!" might have been heard; and we felt ashamed at our want of self-governance; we resolved now to find out the trouble. "The collodion is in fault," we cried, and no sooner was the expression made than we opened a fresh bottle, and fully convinced of success this time we wondered how obtuse we had been not to think of this expedient before. The result was again the same; and now it occurred to us that some nocturnal marauder, some serpent, perhaps Old Nick himself, had been playing some trick with the developer, and we recollected now that both the silver bath and the developer had been left open during the night, and that thus may be a snake had first put its head into the silver solution and then into the iron solution immediately afterwards to stifle the excruciating pains. "Very likely some animal has urinated into the developer," we thought finally; and in a jiffy the old developer was consigned to the earth from which it came, and a fresh developer was prepared.

The result was still the same!
Flashes of lightning and thunderbolts!
Marblings and Arabesques!

"The deuce take it!" we ejaculated, and this was a momentary relief; but on reflection it seemed as if the deuce had already taken it, and it was unnecessary to make such a silly command.

"Let us examine the matter cautiously and with knowledge," we said.

"The silver solution is too weak," interposed the assistant. "How comes it then that one-half of the picture is always good?" we asked the assistant. And our own question brought forward another: "Is it the same end of the plate on which the stains always occur?"

An examination of the plates showed that the upper end of each plate as it stood in the silver solution, was the one which always exhibited the lightning flashes; and now, for the first time, it flashed upon our mind that the bath might all the time be the cause of the morning's troubles. On the surface of the solution there was a shining pellicle or scum like the iridescent patches observable on water impregnated with gas tar; and, without stopping to enquire what this film might consist of, it was observed, that when a collodionized plate was dipped into the bath and then examined by day-light on taking it out, parts of the broken pellicle had adhered to the upper end of the plate as usual. The problem was now solved; and now the remedy was applied. It was noon, and we resolved at any rate and pack up for the day. Returning to our hotel, and finding it impossible to purify the bath sufficiently by the means at hand so as to rely upon its action for the following week, it was deemed advisable that one of us should betake himself home to the laboratory, boil, filter, and strengthen the solution and then return to the field of action on Monday. On Tuesday the bath worked charmingly; and every evening we filtered the solution for the following day; and every three days in the evening the bath solution was boiled and filtered. Since then there has been no more trouble about the silvery deposits on the upper end of the collodion film.

Another trouble, which formerly used to annoy us in the field, was produced by defective washing of the plate after development. This annoyance consisted of brown streaks; and these were produced by some of the iron solution, which had not been thoroughly removed, when it came into contact with the fixing solution. A thorough washing after development is the cure; and, where you have not a large supply of water, drain off the developer thoroughly before you pour on the water, and let a portion of the water rest awhile on the surface of the film to dilute the remnant of the developer, and then wash in the usual manner.

ON THE USE OF IODINE, SULPHUR, ETC., AS MEANS OF INTENSIFYING COLLODION NEGATIVES.

BY JOHN SPILLER, F.C.S.

Some years ago Mr. G. Wharton Simpson suggested the employment of a diluted tincture of iodine for the purpose of modifying the tint, and so adding to the intensity of thin or weakly printing negatives. Prompted by this suggestion, I have been lately trying the action of iodine *vapour* upon the collodio-silver film with a similar object. The form of apparatus employed was a modification of the iodizing box used in the Daguerreotype process, and permitted of exposing the negative, for any required length of time, to the fumes of iodine, at the common temperature; and for the sake of comparative experiment, one-half of the picture was, in each instance, reserved in the original condition. A very few minutes sufficed to effect a change of colour, the rich tone of the pure silver giving way to a cold steel-grey, which, at first glance, appeared to present a decidedly increased density; by longer exposure, the film became gradually changed to a bistre shade, and ultimately took the light-yellow colour of iodide of silver. In this final stage the pictures exhibited in a remarkable degree, the qualities of delicacy and transparency; but, on comparison with the original half-negative in the printing frame, the opacity of the yellow iodide proved to be decidedly inferior to that of the pure silver from which it was formed. The intermediate stages have likewise been tried, but in no instance was any well-marked superiority established; and it appeared difficult to secure a perfectly uniform action over the whole plate. By this mode of operating, the want of cohesion of the argentic compound formed within the film seemed likewise to present an obstacle to the successful employment of the process, although this tendency might be, in some measure overcome by the use of a full-bodied varnish.

The action of sulphur as a means of increasing the density of collodion negatives, appeared well worthy of trial, both on account of the dark colour and opaque nature of the sulphide of silver; 108 parts, by weight, of metallic silver can only take up sixteen of sulphur, whilst in the final (yellow) stage of the last experiment there were not less than 127 parts of iodine absorbed. By dusting over the negative, either of the pulverulent varieties known as "milk" or "flowers of sulphur," the brilliancy of the silver coating gradually gives way to a dull-brown layer, the formation of which is expedited by the employment of a slightly elevated temperature, say from 80° to 100° Fahr. The finely-divided condition of the "milk of sulphur," which is, moreover, commonly impregnated with hydrosulphuretted products, and the absence of sharp, crystalline particles combine to render this form of sulphur, of the two, more eligible. When the action of this element had been exerted to the full extent, or to the intermediate stage desired, the excess of sulphur was shaken off, and the surface further cleansed by softly passing over it a flat camel's-hair brush. After the plate had been varnished in the usual manner its opacity was found to have been but slightly improved, whilst the metallic coating showed signs of disintegration, as observed in the case of iodine. Other negatives were submitted to the action of sulphuretted hydrogen gas, which proved to have but little effect, and then the use of sulphide of ammonium vapour was tried. When the moistened negative was exposed to the alkaline vapours of this chemical reagent, the silver rapidly underwent a change from white to black; but here, again, the molecular effect was disastrous, and the preservation of an even film seemed to be practically impossible, whilst there was a tendency to the formation of a kind of double sulphuret, which would not dry, and immediately affected the purity of the silvered surfaces whenever an attempt was made to print upon paper from such negatives. So far, then, it would appear from these experiments that the actions of sulphur and of iodine vapour cannot be utilized for the purpose of adding to the intensity of thin or weakly-printing negatives. The effects of mercury, chlorine, &c., yet remain to be tried before we discard altogether the use of vapourized substances for such purposes.

[Some years ago we used the vapours of mercury and iodine, applied in succession, for the purpose of increasing intensity, by means of a deposit of iodide of mercury. At first we regarded the experiments as very successful, but, on further experience, we discarded it. The action had a singular effect in rendering the film pulverulent; so that when varnished, it became completely permeated by the solution of resin, and very transparent, the dense yellow deposit being converted into a transparent yellow deposit, which obstructed the passage of light in a very feeble degree. —Ed.]

PHOTOGRAPHY IN THE NORTH.

BY J. WERGE.

On a recent journey northwards, I was tempted to stop at York, take a look at the Exhibition there, and see if there were anything worth notice in the Photographic Department. That part of the Exhibition is exceedingly scanty, but the best Yorkshire photographers are well represented, both in landscape and portraiture. Among the contributors are the names of Sarony, Glaisby, Holroyd, Gowland and other well-known names. Mr. Sarony exhibits a couple of frames containing several "new photo-crayons," cartes de visite vignettes, which are very sketchy and effective, exhibiting those free and "dashy lines" and "hatchings" so characteristic of the "softening off" of artistic crayon drawings. This effect may be produced by a process of double printing, but it is more likely to have been obtained direct in the camera from a screen, having the edges of the aperture "softened off" with some free touches. The screen, in all probability, being placed between the lens and the sitter. Mr. Sarony also exhibits some large photographs very beautifully finished in colours. Messrs. Gowland exhibit, in a revolving case, a very unique collection of medallions and vignettes, both plain and coloured, mounted on tinted grounds, which give the pictures a very chaste and delicate appearance. The photographs themselves are exquisite bits of artistic pose and careful manipulation. They also exhibit a charming vignette of twenty-nine young ladies, all cleverly arranged, each figure sharp and distinct, and evidently recognizable portraits. This picture reminds one of Watteau, for the figures are in the woods, only, instead of semi-nude nymphs, the sitters are all properly and fashionably dressed young ladies. Messrs. Holroyd contribute some very excellent cartes de visite and enlargements. Mr. E. C. Walker, of Liverpool, exhibits some very beautiful opalotypes, or "photographs on enamelled glass." Mr. Swan, Charing Cross, London, also sends specimens of his crystal cube portraits. Mr. A. H. Clarke, a deaf and dumb photographer, exhibits some very good groups of the Princess of Wales, Lady Wharncliffe, Lady Maud Lascelles, Countess Granville, and the Hon. Mrs. Hardinge, taken in the conservatory, when the Princess and suite were on a visit to Studley Royal, Yorkshire.

Amongst the landscape photographs are to be found some of Bedford's finest views of Egypt and Jerusalem, Devonshire and Warwickshire, the beauties of which are so well known to every one interested in photography. Some of the local views by local artists are very fine; W. P. Glaisby's views of York Minster are capital, especially the interiors. Messrs. Jackson Brothers, of Oldham, exhibit some very fine views, and show what atmospheric effects the camera is capable of rendering. Their view of "Birstall Church" is a perfect master-piece of photo-aerial perspective. There are also a considerable number of photographic productions from the South Kensington Museum. Mr. Gregson, of Halifax, exhibits some excellent photographs of machinery.

In apparatus there is nothing novel or striking, there being but one case of cameras, &c., exhibited by a London maker. There is a "water agitator" in the machinery "annex," for washing photographic prints, but the invention is more ingenious than effective, for the water is not agitated sufficiently, except in the immediate neighbourhood of the fan or "agitator," which moves backwards and forwards in the water, in a manner somewhat similar to the motion of the pendulum of a clock, and so laves the water to and fro, but the force is not sufficient to prevent the prints from lying close together at the extremities of the trough, and imperfect washing is sure to be the result. The motion is given to the "agitator" by the water falling on a small wheel, something like "Williams's revolving print washing machine."

To describe the Exhibition itself: It is rather like a "compound mixture" of the church, the shop, and the show. The "Great Hall" is something like the nave of a wooden cathedral, with galleries running all round, and a grand organ at the end, peeling forth, at intervals, solemn strains of long measure. Over the organ, in white letters on a red ground, is the quotation, "He hath made all things beautiful in his time."

The show cases on the floor of the Grand Hall are arranged as indiscriminately as the shops in Oxford Street. In one case there are exhibited samples of "Colman's mustard," in that next to it samples of "Elkington and Co.'s plated goods," and, in another close by, are samples of saddlery, which give the place more the business aspect of a bazaar than the desirable and advantageous classification of an exhibition. Then you are reminded of the show, by the frequent ringing of a loud bell, and cries of "This way to the fairy fountain, just going to begin, only two pence." Such things jar on the ears and nerves of quiet visitors, and are only expected in such a place as the Polytechnic in London.

The great features of the York Exhibition are the picture galleries; and here a better order of things prevails. The collections are classified; one gallery, or part of it, being devoted to the works of the old masters, another to the modern, and another to the water colours. Among the old masters are some fine portraits by Velasquez, Tintoretto, Rembrandt, Vandyk, Sir Joshua Reynolds, Gainsborough, Sir Peter Lely, and others. And some of those grand old landscapes by Salvator Rosa, Rubens, Claude, Wilson, the English Claude, and George Morland, such pictures as are rarely seen out of private collections. The modern masters are abundantly represented by Wilkie, Etty, Frith, Westall, Faed, Cope, E. Nicol, Stanfield, Linnell, and a host of others. Amongst the water colours are many fine examples of the works of Turner, the Richardsons (father and sons), Birket Foster, &c., &c.

Sculpture is very faintly represented, but there is a charming little Canova, Dirce, exhibited by the Lord Wenlock. An antique bust of Julius Cæsar, which seems to have been found in fragments and carefully joined together. This bust is exhibited by the Hon. P. Downay, and was found in Rome, amongst some rubbish, while some excavations were being made. There is also an interesting series of marble busts of the Twelve Cæsars, exhibited by Lord Londesborough. The Exhibition is open in the evening, and brilliantly lighted with gas till ten o'clock; and, taking it "all in all," it is a very creditable effort in the right direction, and does honour to York and Yorkshiremen.

Further north still, at Newcastle-on-Tyne, there is another exhibition of "Arts and Manufactures," the chief photographic feature of which is a considerable display of "Swan's Carbon Prints," from several well-known negatives by Bedford and Robinson. The promise of this process is very great, and its commercial advantages were singularly demonstrated to me when visiting the printing establishment of Mr. Swan, which I happened to do on a dark and unfavourable day—one totally unfit for silver printing; and yet I saw several very beautiful carbon prints that had been produced that day, the rate of production being about eight to one over silver printing. As a proof of the certainty and commercial application to which Mr. Swan has reduced his beautiful process, I need only mention that he has undertaken the printing of two thousand copies of the celebrated picture of "The First General Assembly of the Church of Scotland," painted by D. O. Hill. This historical picture contains four hundred and fifty portraits: the negatives were taken from the original painting by Mr. Annan, photographer, Glasgow, and are 32 by 14 inches, and 24 by 9 inches; and Mr. Swan has to turn off one thousand copies of each within a given time. The publishers of the work give a guarantee to their subscribers that every print shall be of a high standard, for each one has to pass the examination of two competent judges. They also very justly pride themselves on being the very first to translate and multiply such noble works of art by a process "so beautiful, and, at the same time, *imperishable.*" I saw several of the prints, both in process of development, and complete; and anything more like rich, soft, and brilliant impressions of a fine mezzotint engraving I never saw, by any process of photography,

Mr. Swan's arrangements for conducting the various parts of his process are very extensive and complete; and his mode of "developing and transferring," seems to be the very acme of perfection. But, as Mr. Swan is about to publish a work containing a full description of the process, with a beautiful specimen print as frontispiece, I will not anticipate him, or mar his own comprehensive account of the details of a process which he has brought to such a state of beauty and perfection, by an amount of patient perseverance and thoughtful application rarely exhibited or possessed by one individual.

I also visited the photographic establishment of Messrs. Downey in Newcastle, and there saw some *cabinet pictures* of the Princess of Wales, taken recently at Abergeldie Castle. Messrs. Downey have just returned from Balmoral with upwards of two hundred negatives, including whole-plate, half-plate, and *cabinet* size, which will be published in one or all those sizes, as soon as the orders of Her Majesty have been executed. From the well-known reputation of the Messrs. Downey as photographers, it is, in all probability, a treat in store for the lovers of photography, to get a sight of their latest works at Balmoral and Abergeldie.

Mr. Parry, another excellent photographer in Newcastle, was also making arrangements to introduce the new cabinet size picture in a style that will insure its success.

Altogether, the movements of the best photographers in the North are highly commendable, and, with their notoriously practical minds, there is little doubt of their undertakings becoming a success. Let us hope that the same elements of energy and "push" will speedily impregnate the minds of all photographers, and create a combination that will develop a new form of popular beauty, and result in forming a salt that will savour their labours, produce deposits of gold, and create innumerable orders of merit.

ON OBTAINING BLACK TONES IN HELIOCHROMIC PROCESSES.

BY M. NIEPCE DE SAINT VICTOR.*

[SOME details of M. Niepce de St. Victor's method appeared last week in the letter of our Paris Correspondent. The additional information will be read with interest.—ED.]

In a communication presented by me in October, 1865, I mentioned four methods by which black tones may be obtained in heliochromy. I will now describe the first of these processes—the only one, in fact, by which I have been enabled to produce black tones in the presence of all colours.

The silver plate must be prepared in the following manner:—After it has been chlorized in the particular way described in my previous communication, it is plunged into a bath containing 50 centigrammes of caustic soda dissolved in 100 grammes of water, to which a small quantity of chloride of sodium has been added. The bath should be kept at a temperature of 50 C., and the plate is allowed to remain immersed for a few seconds, the liquid being well agitated during the time. When taken from the bath, it is well washed, and then heated till it assumes a violet hue, due, probably, to a slight reduction of the chloride of silver. The plate is then coated with the dextrine and chloride of lead varnish, as previously described by me.

Working with a plate thus prepared, it is possible to obtain all colours, with whites and blacks of different shades of intensity, according to the manner in which the plate has been prepared, or as the blacks in the model are dull or brilliant. The reduction of the silver must not take place too rapidly, or intense whites and blacks will be produced. It is for this reason that a little chloride of sodium, or even a few drops of ammonia, are added to the soda bath.

The action of dark shades was well shown in one of my experiments. I copied, by contact, a coloured picture of a soldier, and obtained all the different colours of his uniform. The black bearskin, as likewise one of his gaiters (I cut out the other one), had produced a very marked impression upon the plate, giving a black tone of more or less intensity; the plate was white at the spot where I had cut a portion out of the picture.

By previously reducing the chloride of silver by the action of light, black tones of greater intensity may be obtained; but the colours thus produced are less brilliant than those given by the other method.

To effect the reduction of the chloride of silver by light, the plate, after being chlorized, is covered with the dextrine and chloride of lead varnish; it is then exposed to diffused light for five or ten minutes, and afterwards heated. A violet black tone is thus produced upon the plate, of a greater or less intensity, according to the duration of the exposure.

I will now proceed to describe a double action of light and heat upon chloride of silver, by which very sensitive effects in relief may be obtained.

A plate is chlorized, immersed in the soda bath, and then coated with the dextrine and chloride of lead varnish without being heated. A coloured engraving is placed against the plate, and exposed to the light for eight or ten minutes, when the picture is removed, and the plate submitted to the action of heat. On being warmed, all the colours, and more especially the blue and red, become very intense; the picture is again placed against the plate and exposed to light a second time, when the colours are developed in relief.

The plate is again heated, to fix the colours, and in this manner the red remains persistent for a long time, while the yellow and blue are the first to disappear. This effect of relief may likewise be produced in the camera, provided that the chloride plate has previously been coated with the dextrine and chloride of lead varnish. If the film of dextrine be removed from a picture in relief, the relief still remains, and it is just as sensitive as before; the result is the same if the chloride of silver is dissolved by ammonia.

With regard to the sensitiveness of the chloride of silver film, I have come to the following conclusions.

When the film has been reduced by the action of light or the soda bath, it is less sensitive to light after heating than a film which has not been reduced at all. If one half of a prepared plate be covered by a piece of glass, coloured yellow by oxide of uranium, and the other half by a piece of white glass of the same thickness, that portion of the plate covered by the yellow glass will be found to be much more sensitive to impression by colours. The greater the thickness of the yellow glass, the quicker will be the action on the plate; but as the yellow tint interferes with the colours, its employment is inadmissible. Chloride or nitrate of uranium may be added to the chloride of lead in the varnish, to render the plate more sensitive, but the keeping qualities of the varnish are thus impaired.

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* *Cosmos.*

I sum up my conclusions thus:—Under certain conditions all shades of black possess a certain power of impression, and produce effects on a sensitive film similar to those obtained with colours.

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THE TESTING OF COLLODION BY THE SPECTROSCOPE.*

The following is a report of remarks made by President Rutherford at the April meeting of the Photographical Society.

Mr. Duchochois is the only gentleman who has responded to the request I made at the last meeting of the Society, that those engaged in making collodions should furnish us with specimens, differently sensitized, in order that they might be submitted to the pure colours of the spectroscope, and thus determine what agents were of the most value in receiving the impressions of different colours. Mr. Duchochois sent me about ten days since five specimens:

No. 1.	Plain Collodion.........	30 fl. oz.	
	Iodide Sodium...........	75 grs.	
	Iodide Cadmium........	91 grs.	pale yellow.
	Bromide Sodium........	52 grs.	
No. 2.	Plain Collodion.........	30 fl. oz.	
	Iodide Cadmium........	182 grs.	lemon colour.
	Chloride Magnesium...	38 grs.	
No. 3.	Plain Collodion.........	26 fl. oz.	
	Iodide Cadmium........	91 grs.	sherry colour.
	Bromide Sodium........	52 grs.	
No. 4.	Plain Collodion.........	30 fl. oz.	
	Iodide Sodium...........	149 grs.	sherry colour.
	Iodide Silver to saturation.		
	Bromide Sodium........	52 grs.	
No. 5.	Plain Collodion.........	30 fl. oz.	lemon colour.
	Iodide Sodium...........	149 grs.	

I had in my possession—

No. 6.	Anthony's Negative Collodion (composition unknown) five months old.		lemon colour.
No. 7.	Excelsior Collodion O. S. Follett's, two months old.		pale yellow colour.

To-day is the first I have been able, for many causes, to devote to the experiment. I exposed each of these seven samples of collodion to the solar spectrum, produced by a flint glass prism of 60 deg. The heliostat slit, focus, and all other instrumental adjustments of the spectroscope remained unchanged, each plate had the same exposure (20 S.), and all were sensitive in the same bath (45 grs. with acetic acid), and subsequently treated with the same developer, viz.:

Double sul. iron and ammonia ...	1 oz.
Water	16 fl. oz.
Acetic acid	1½ fl. oz.
Alcohol	1 fl. oz.

In each case the first development was pushed as long as any results could be obtained; the plate was then washed and cleared in hypo.

The negatives which I submit to the Society show the results:

No. 1 exhibits traces of action slightly into the green blue at F, and decidedly beyond H, the limit of the visible spectrum; the strongest action is near G, blue violet, slightly less in the violet to H, and by little in the violet blue and blue; the principal activity is found between Kirchoff's line, No. 272 and H.

No. 2. There is a little greater action on the violet side of line No. 272 than No. 1, and as in that case the most intense portion is quite near G, and on the least refrangible side; but at No. 272 all traces cease, and there is no evidence of action in the violet blue, blue, or green blue.

No. 3 resembles No. 2 in all respects, except that a slight action is seen in the violet blue fading into the blue, in which colour no trace is visible beyond Kirchoff's line 242.

No. 4 is in all respects similar to No. 3, except, perhaps, a little greater intensity in the blue violet.

No. 5 differs from all the preceding; it presents an almost uniform action from F, in the edge of the green blue to H, at the limit of the violet spectrum, but the greatest intensity is to be found in the violet blue between 220 and 260 of Kirchoff's chart; a portion of the spectrum entirely wanting in No. 2, and almost entirely absent in Nos. 3 and 4; on the other hand, there is scarcely a trace of H, and the ultra violet spectrum. All parts of this negative are rather thin.

No. 6. Anthony's collodion seems to have produced a negative of greater compass than any of the former, varying but little in force from F to H; unlike the last, however, the slight preponderance of action is found on the violet side of 272; the green blue and the ultra violet are seen to the margin of the plate. This negative is much more intense than No. 5, but in no portion nearly so intense as the active parts of Nos. 1, 2, 3, and 4.

No. 7. Excelsior collodion almost exactly resembles No. 2; the spectrum terminates abruptly at No. 272, and is but slightly traceable beyond H; its greatest intensity is near G.

I will not trespass upon your province by enlarging upon the conclusions to be drawn from these facts, except to hint at the following:

1. It is not true, as popularly stated, that a bromide is necessary in order to reach the less refrangible end of the actinic beam. No. 5, which of all the samples with known composition is not active in that direction, contains iodide of sodium alone. No. 1, which is next in this respect, also contains iodide of sodium.

2. Such collodions as No. 5, No. 1, and Anthony's, are best for these purposes; to obtain pictures of objects of other colours than violet and blue, and also for days when the light is yellow, to be used in cameras and other instruments which have a chemical focus (so called).

3. Such collodions as No. 2 and the Excelsior are best to be used in an instrument such as my photographic refractor (corrected alone for the actinic ray), because the range of activity is short, and consequently more easy to render truly achromatic in a photographic sense.

4. By an inspection of all the seven plates, it seems that there is but a given amount of actinic force resident in a given spectrum, and that a collodion which is affected between narrow limits shows a proportionate strength within those limits, while a collodion which, like No. 5 and Anthony's, having great compass, possesses that quality at the expense of great force in any portion.

[The negatives exhibited by President Rutherford need to be seen and studied to be fully appreciated. Prints from such negatives ought to be published.—Ed.]

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* *American Journal of Photography.*

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Recent Patents.

STIPPLED GRADATION IN PHOTOGRAPHIC ENGRAVING.

BY D. WINSTANLEY, JUN.

The following specification describes an exceedingly ingenious idea for the production of gradation in plates produced by the aid of photography for intaglio or surface-printing. Whether the plan will prove as successful in practice as it is ingenious in theory, remains to be proved. It is unfortunate that the specification is characterized by such excess of verbiage, and unnecessary use and repetition of geometrical terminology, that it will be difficult for the majority of readers to disentangle its meaning from the labyrinth of words in which it is hid; but we may introduce it by briefly indicating the general purpose and plan of the invention. An image in relief having been obtained in chromated gelatine, it is proposed to take a bundle of wires with sharpened or tapering points, and place these points on the image in relief. It will necessarily follow that the points of those wires resting in the deepest hollows will project the most from the bundle, and all the other points will project in exact relation to the depression or elevation of surface in relief on which they rest. If the sheave or bundle of wires be firmly bound when in this position, and then all the points ground off so as to form a plane surface, that surface will consist of a series of dots, varying in size in proportion to the amount of the tapering point removed by grinding. Those which had sunk deepest will have a large portion of the tapering end removed, and so producing a surface which will form a large dot; those resting in the shallower depressions will have a small portion removed, and the end will produce a small dot, and so on; the result being a series of dots of different sizes, the larger ones, when reproduced in black ink, representing the shadows of the picture, and the smaller ones the various gradations of half-tone. It will be seen that the gradation in the image consists of a stippling surface of dots of various sizes. The specification proceeds as follows:—

If an indentation be made into a flat plate of metal or other substance, and there is then introduced vertically into this indentation the end of a piece of wire or other material having a conical or pyramidical or other pointed termination, it will be seen that the particular portion of the point, cone, or pyramid which is exactly in the general plane of the surface of the indented plate, has a diameter which is determined by the depth of the indentation into which the end of the wire has been introduced, that is to say, if the indentation be but slight, that portion of the wire which is on a level with the general plane of the plate is near the apex or smallest diameter of the cone, and if the indentation be comparatively deep, the portion of the wire (or rather its pointed termination), then in the general plane, will be nearer to the base, or largest diameter of the cone or pyramid forming such termination. In performing the above experiment, it is necessary that the vertical elevation of the cone or pyramid (that is to say a straight line drawn from the centre of its base to its point), should measure, at all events, as much as the deepest portion of the indentation into which the aforesaid cone or pyramid is introduced. The fact here mentioned forms the basis of my invention, by which I am enabled to produce, by the aid of photography, printing surfaces in which the lights and shades are represented by accumulations of dots equal in number but differing in magnitude, or equal in magnitude but differing in number. The method of producing the gradations in the latter way I will hereafter describe; that they may be produced in the former way will be evident from the following explanation:—The horizontal section of a cone or pyramid is bounded by a circle, triangle, rectangle, or polygon, the vertical section by an isosceles triangle. If we make a horizontal section immediately above the base, its circle, triangle, rectangle, or polygon will have a diameter possessing measurable magnitude (unless, indeed, the cone itself be invisible). If, however, the section be made immediately below the apex, the diameter of the resulting circle, triangle, rectangle, or polygon will be immeasurable on account of its infinitesimal minuteness. From this we perceive that, by properly adjusting the dimensions of our cone or pyramid, we may, by making a vast number of horizontal sections, real or imaginary, obtain a series of circles, triangles, rectangles or polygons, descending from one having any given magnitude with the most perfect gradation to another having no measurable or visible magnitude at all. It is well known in photography that when a layer of bichromated gelatine or other suitable material or mixture is exposed in a proper manner, under a negative photograph, to the chemical action of light, its parts are rendered more or less insoluble in proportion to the extent to which they have been acted upon by that light; hence when, after this operation, such a film or layer is immersed in hot water or other proper solvent, those portions which have not been acted upon by light are dissolved out, and a picture standing out in relief upon the plate or surface supporting the gelatine or other material is the result. Such pictures are known in photography as "pictures in relief," "photo-relievo" pictures, "gelatine reliefs," &c. The method of producing them was devised some years ago, is well known, and therefore not claimed in the present patent. The chief characteristic of these pictures is, that all gradations of light and shade in the negative photograph from which they were produced, are faithfully represented by corresponding thicknesses of gelatine (or other material). These pictures, thus obtained by photography, form the basis upon which, in my present invention, I work, and by availing myself of the facts I have already mentioned concerning the cone or pyramid, I obtain "printing surfaces" from them, and therefore, "by the aid of photography," metallic, or other reverses or "intaglios," have also been obtained, by a variety of means, from these reliefs, and, together with their mode of production, are likewise well known in photography.

According to my invention I take a rectangular, circular, or other suitably shaped framework of iron, brass, or other suitable metal or material, containing or filled with a number of wires or other strips of metal, or other hard or rigid material, each having a conical, pyramidical, or other pointed termination, and all bound or secured or held together by mechanical or other suitable appliances or means, and I place the surface of points thus obtained upon one of the before-mentioned gelatine or other reliefs, or metallic or other intaglios; I then loosen the wires, and, by allowing them to fall, or by mechanically pressing, or magnetically attracting, or by vibration, or other means, cause them to descend into the depressions, or on to the uneven surface of the aforesaid relievo or intaglio picture, and by this means I obtain the reverse of such picture in a series of points, conical, or pyramidical or otherwise. The greatest depth of the mould (that is to say, of the gelatine relief or metal intaglio,) must be the same as the perpendicular elevation of the isosceles triangle produced by the vertical section of the cone or pyramid forming the point of the wires. All the points of the wires must be uniform in size and shape. The descent of the wires I have accomplished most easily by simply causing a gentle vibration of the whole apparatus, whereupon they readily fall into their proper places. The framework of wires is now turned upon its side, so that the wires are in a horizontal instead of a vertical position. The relief or intaglio during this operation is, of course, kept in contact with them. After the operation it may be carefully removed, without in the slightest degree altering the position of the wires, which may then be secured firmly together by mechanical, calorific, or other suitable means.

If it were attempted to bind the wires together without first separating the relief or intaglio from them, the picture would be destroyed, because the wires, when bound together, occupy less space than when loose, and the movement of the wires in the process of binding would either cause their own destruction or derangement, or the destruction of the gelatine or other relief, or metallic or other intaglio. The removal of the frame and wires from the relief, &c., is therefore necessary for the preservation of the picture, and is readily accomplished, as already directed, by turning the whole carefully upon its side, and then carrying away the relief or intaglio. The wires are originally placed in the frame horizontally, and are caused to take up the least space they will fall into by gentle vibration. The clamp in the frame is then screwed down from above until it just touches them; nearer to each other than this it is obvious they cannot fall when again laid horizontally for the removal of the relief or intaglio, but they can be forced nearer together when pressure is applied. The application of pressure to the wires must take place in due proportion from two sides of the frame, or a properly distorted negative must be employed, else a distortion of the picture will certainly ensue upon binding the wires in one direction only. The uneven surface of cones, pyramids, or other points thus obtained, is now to be planed, filed, ground, or otherwise cut, or abraded, or acted upon, until the terminations of the wires are all reduced to, or near to one general plane. The result will be a picture the light and shades of which are represented by dots, points, or marks, of a diameter greater or less according to the elevations or depressions of the relief, or intaglio, from which the uneven surface was produced. This surface may now be used to obtain pictures (that is to say, copies of itself) in opaque or printing ink, by the method known as typographical or block printing. The resulting picture will possess gradations of tone or shade produced by dots of greater or less diameter, and will be "positive" and correct, or "negative" and reverse, according as an intaglio or relief was used in the former process.

The wires used may be made of any metal or alloy, or may, for some purposes, or in some cases, be replaced by elongated strips of any other hard or rigid material, and in shape may be such as to present, when cut at right angles to their length, a section bounded by a circle, an ellipse, a triangle, a rectangle, a hexagon, or other suitable figure. The frame to hold these wires may be of any size or shape best adapted to the subject of the intended picture, and may be constructed of metal or other hard or rigid material, preferable, however, of metal. The material of which the frame and the wires are respectively composed should not be alike, inasmuch as when any difficulty is experienced in binding the wires by any mechanical means, they may be firmly bound by calorific means; thus brass expands when heated more than iron does; hence, if the wires are of brass and the frame is of iron, the wires, however tightly bound when cold, will become more so by simply heating. It is better, however, to have them made in the reverse way—that is to say, the frame of brass and the wires of iron, because then they can be easily screwed whilst hot, and will be more firm on cooling to a temperature at which some of the subsequent manipulations may be more easily conducted. The binding of the wires may be effected either mechanically, as by screws, levers, or wedges (preferably, however, by screws), or calorifically (as by partial fusion or by expansion), or they may be held by a foreign substance adhering to their outer terminations. Of these methods, however, I prefer the mechanical. In order to hold the tapering extremities in their proper position during the cutting or grinding process, lead, or type metal, or other suitable material, may be cast amongst them and melted out after the operation. For the economy of the wires (which for convenient use are better when pointed at both ends) casts or impressions in type metal, or other suitable material, may be taken from them, which, when ground or cut to the proper extent, may be used for printing by the "copper-plate" method, or which, without being ground or cut, may be used to obtain casts or impressed fac-similes (in any more fusible or plastic material) of the original surface of the wires. These fac-similes may then be easily cut or ground into a plane for the purposes of ordinary "block-printing," and the pointed wires can be used again an indefinite number of times for obtaining the uneven surface from the gelatine or other reliefs, or metallic or other intaglios. The grinding or cutting of these stereotypes I have done by workmen accustomed to similar operations. The method of operating suggests itself at once to an intelligent workman, has no novelty, and is not claimed in the present invention. The foregoing method relates exclusively to the production of a variety of shades by dots equal in number but differing in magnitude.

My method for obtaining gradation of light and shade by dots equal in magnitude but differing in number is based upon the foregoing, and is as follows:—A plate as prepared for block-printing, by the method already described, or as prepared for copper-plate printing is used in this method. I prefer, however, to use a plate as prepared for copper-plate printing, in which the impression has considerable depth, and which plate has been ground from behind until every point is just represented by a hole. By pushing the fine wires through these holes I obtain a deeper cut and better printing plate. Upon this plate a frame containing a multitude of very fine wires is placed, and an impression of the surface of the plate is obtained in them in the same way as the impression is taken in the pointed wires from the relief or intaglio. Upon binding these wires together we obtain a surface in which the lights and shades are represented by greater or lesser numbers of dots, having the same size. This surface may then be planed, cut, or ground, or casts or impressions in reverse or fac-simile may be taken from it, as in the method before mentioned, and used for obtaining pictures or impressions, either by the "block-printing," or by the "copper-plate" method. Stereotyping from the wires may be accomplished by laying the surface of them into a box of fused type-metal with proper precaution, the result will be of course a reverse. If, instead of the points being introduced into the type metal, the bases are so introduced, then the type metal when cold will serve as a cushion to prevent the descent of the wires when pressure or percussion is applied from above. In this way, stereotyping in fac-simile may be accomplished by a method already well known and extensively practised, in which a plastic material is introduced by pressure or percussion into the interstices of the surface to be stereotyped. This plastic material is then baked, and type metal cast into the mould so produced, in order to obtain the final stereotype.

Having now described the nature and object of my said Invention for "Improvements in Producing Printing Surface by the aid of Photography," together with the manner in which the same is to be or may be performed, or carried into practical effect, I would remark, in conclusion, that I claim as my Invention the production of plane printing surfaces (from reliefs or intaglios produced by the aid of photography) by means of a number of pointed wires applied and used substantially in the manner and for the purposes hereinbefore more particularly described and set forth.

OPALOTYPES WITHOUT OPAL GLASS.

BY VICTOR MOREAU GRISWOLD.

The object of the following invention is to produce on plain glass, by means of a collodion giving a white opaque, or opaline film, pictures which shall resemble those on opal glass. The process only received provisional protection :—

My invention consists of an improved photographic surface, prepared and finished in the manner and by means of the compositions hereinafter described, and also in the compositions and process for producing the same, as hereinafter set forth.

The object of thus preparing and finishing a photographic surface, is to reduce expense, simplify the process, and provide a means for taking photographic pictures on any prepared material, by previously coating it with a perfectly white opaque film; while, at the same time that the expense is less, I am enabled to make a better picture.

In order to carry my invention into effect, I first make a collodion by the following formula :—

Solution No. 1.—Opal Collodion.

Alcohol, 95 per cent.	10 ounces
Sulphuric ether	15 ,,
Acetic ether	2 ,,
Gum kowrie	1 ounce.
Gum shellac, bleached	½ ,,
Solution cotton...	90 grains
Castor oil	25 drops
Glycerine	25 drops.

The proportions and quantities of the above-named substances may be changed or modified according to the effect desired to be produced, and for the purpose of rendering the resulting film more or less tough and pliable, or thin and powdery, as well as to affect its sensitiveness to light, and secure either a moist or dry surface. The collodion film must be well dried before plunging into the silver bath. The acetic ether in the above solution renders the collodion film powdery by opening the tissue or fibre, the castor oil renders it tough and prevents "bronzing" in printing, and the glycerine makes it moist or renders it capable of retaining moisture. The solution may be used and moderately good results obtained without either the acetic ether, castor oil, or glycerine, and other resinous gums may be substituted for the gum kowrie and gum shellac named therein, but I prefer using the formula as given, as better results are thereby obtained than by any other with which I am acquainted.

I next prepare a sensitizing solution as follows :—

Solution No. 2—Sensitizing.—

Water	3 ounces
Alcohol, 95 per cent....	2½ ,,
Muriatic acid	½ ounce
Chloride of calcium	1½ ,,
Chloride of ammonium	1 ,,
Bichloride of mercury	1 ,,

The mixed acid and water should be poured upon the chlorides, and agitated in a warm place until dissolved, and then the alcohol added.

While the above formula is an improvement in the art and makes a better picture, still the most important advantages of my invention may be secured, in connection with my improvements, by the use of other proper sensitizing solutions known to the trade.

Of this solution (No. 2) add to the collodion solution (No. 1) from two to ten drops to each ounce of collodion, according to the strength of the ammonia nitrate bath or the tone desired to be produced. If the plain silver bath is used with ammonia fuming, the smaller quantity named will be sufficient; in either case the silver bath must be strongly impregnated with alcohol, say eight ounces in a bath of forty ounces. On coming from the silver bath the plate should be again thoroughly dried before being exposed under the negative.

After exposure the plate is immersed in a solution composed as follows:—

Water	4 ounces
Solution No. 2	30 to 40 drops.

And gently rubbed with a piece of soft sponge or a soft camel's hair brush to remove all the unreduced silver from the surface before toning and fixing. The picture should now be washed thoroughly and toned, and fixed by any of the many toning and fixing processes, and "finished" with the opal picture enamel herein after described.

For printing in the camera, I vary the above process by using the opal collodion (Solution No. 1) sensitized by any of the formulas for sensitizing bromo-iodized collodion, and I then use the ordinary nitrate of silver bath.

When the plain silver bath is used with ammonia fuming I produce the vapour of ammonia as follows:—

Lime unslacked	1 part
Ammonia alum	1 ,,

The lime and alum pulverised separately, and then triturated together, and placed in the fuming box. By the use of this mixture I obtain strong ammonia fumes at a cost very much below that of any other process now known to the trade.

The plate is exposed wet in the copying camera and developed in the usual manner; if desired it may be toned with chloride of gold and afterwards fixed with cyanide of potassium or hyposulphite of soda.

This last process converts the picture into a negative, and it is reconverted into a positive by the application of the following:—

Water	3 ounces
Solution No. 2	½ ounce.

This solution is kept upon the plate until the details are clear and sharp, when it is thoroughly washed and dried, and finished with the following solution:—

Solution No. 3—Opal Picture Enamel.

Bleached gum shellac	2½ lbs.
Borax	6½ ounces
Water...	1 gallon
Linseed oil	2 ounces
Sulphuric acid	1 drachm
Albumen	1 ounce.

The borax should be dissolved in the water over a fire, and, when dissolved, the sulphuric acid well stirred in. Next, the oil should be added and the solution brought rapidly to the boiling point, after which the shellac should be added, the mixture being stirred continually until the shellac is dissolved, when it should be allowed to become cool, then add the albumen, previously beaten up with about a pint of the "enamel." When settled, unless it is designed to be used upon wet films, add about one-third of its bulk of alcohol, to make it flow readily over the plate. Let the enamel dry "spontaneously" in a moderately warm place. In the above solution (No. 3) the linseed oil is used to render the enamel tough and pliable, the sulphuric acid to harden it, and the albumen to clarify it and give additional lustre. The enamel may be made and used very well without the three ingredients above named, but I prefer using them, as a better result is obtained thereby.

The above-described manners of producing the opal collodion, sensitizing solution, and opal picture enamel, while apparently distinct in themselves, are each very important in the obtaining of the desired object, which is the production of a more perfect photographic picture, upon an opal surface, in a comparatively cheap and easy manner. By the above process and compositions I am enabled to form a perfectly white opaque collodion film, sensitized by a process which gives increased rapidity to the action of the light, and also preserves the purity of the white film as well as the film itself, and finished with an enamel which is peculiarly adapted to this purpose, and the only one I have been able to discover which will not render the white film transparent and ruin the picture.

I am also enabled to print photographic pictures upon japanned iron or other japanned surfaces of any colour, or upon glass, superseding the present difficult and expensive opal glass process; or upon cardboard, or other paper or paper-like surface previously prepared for the purpose, or any other smooth surface, thus doing away with much of the present tedious and expensive manipulations in printing photographs or opal pictures.

Proceedings of Societies.

The South London Photographic Society.

The First Meeting of the Winter Session of this Society was held in the City of London College on the evening of Thursday, the 11th instant, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a previous meeting were read and confirmed, and the following gentlemen elected as members of the society: Mr. W. J. Hunnings, and Mr. J. Bower.

The Chairman congratulated the members on meeting together again, and took occasion publicly to thank those of them who had presented him with a handsome portfolio of photographs during the summer. There was no paper before them, but he had to call attention to an interesting illustration of photographic progress in the shape of the exceedingly beautiful photograph in carbon, which was now ready for distribution as the presentation print. He should ask the members to pass a vote of thanks to Mr. Blanchard, and to Mr. Swan, for enabling the Society to distribute such a valuable art-photograph to the members.

A vote of thanks was carried by acclamation.

The members then engaged in general conversation on some very fine examples of Mr. Rejlander's art-photography, on some fine examples of landscape photography by Mr. Frank Howard, all of which were enamelled with gelatine and collodion, many of them also having skies printed in, with excellent effect, which received much admiration. Specimens of Angerer's card groups, and of Mander's cabinet album, were also examined.

Mr. Taylor exhibited two prints, one of which was from a negative taken with a bath giving stains and pinholes; the second was from a negative taken with the same bath after treatment wsth cyanide of potassium, and was beautifully rich, vigorous, and clean.

Mr. Beckett asked if it had been explained why a bath treated with cyanide, not only gave negatives free from defects, but yielded finer results than a new bath, and better than a bath treated with carbonate of soda, having more intensity and a fine bloom.

Mr. Wharton Simpson said that it had been ascertained by experiment that the presence of nitrate of potash in the negative bath tended to the production of rich, vigorous negatives. Photographers knew that a collodion containing iodide of potassium gave vigorous negatives, doubtless from the same cause. When cyanide of potassium was added to a bath, a precipitate of cyanide of silver was thrown down, taking with it other impurities, and leaving nitrate of potash in solution.

A general conversation followed, in which Mr. Beckett, Mr. Foxlee, and others took part, after which the proceedings terminated.

It was announced that at the next meeting Mr. Hart would read a paper on the "Diffusion of Solutions through Prints," with an especial view to fixing and washing operations, and then Mr. Wall would read a paper on focussing.

The presentation print, consisting of exceedingly fine proofs in carbon of Mr. Blanchard's fine picture, "The Zealot," were distributed amongst the members.

Correspondence.

BONA FIDE INVENTORS.

Sir,—When Godiva, the pure wife of that grim Earl who ruled a thousand years ago in Coventry, obeying the hard injunction of her rough lord, rode naked through the town, and took the oppressive tax away,

> "One low churl, compact of thankless earth,
> The fatal byword of all years to come,
> Boring a little augur hole in fear,
> Peeped—but his eyes, before they had their will,
> Were shrivelled into darkness in his head,
> And dropt before him. So the Powers, who wait
> On noble deeds, cancell'd a sense misused."

It has often suggested itself to me that if some such retribution as occurred to Peeping Tom could overtake the *memories* of those who only exercise that blessed faculty to bad and mischievous purposes, a good end would be gained; the wicked would be punished, and photographers, when they met with any little improvement, fancied or real, in their practice, would be able to bring it forward without fear of the abuse that is sure, under the present system, to fall upon those who detail, for the general good, the fruits of their individual experience. I do not know any prominent discovery from Mr. Woodbury's invention to Mr. Claudet's suggestion, including, Sir, your own collodio-chloride process, that has not been claimed by others, and by claimants so obscure that none of us have had the pleasure of hearing their names before.

It is undoubtedly the fact, that many photographic inventions that have been lately brought out, and have proved of the greatest use, have been foreshadowed, in a mystic sort of way, years ago. There are those who, with the aid of a manual of chemistry, write long lists of processes, probable and improbable, possible and impossible, for the sole purpose of claiming the merit of any analogous invention when it has been perfected, after years of perseverance, by another; but it is scarcely fair to award to these adventurers the honours of patient research and real genius. Oliver Wendell Holmes, in his "Autocrat of the Breakfast Table," says, on the subject of writing poetry—and his remarks apply equally to invention—"When a person of fair character for literary honesty uses an image such as another has employed before him, the presumption is, that he has struck upon it independently, or unconsciously recalled it, supposing it to be his own." He goes on to say:—"It is impossible to tell, in a great many cases, whether a comparison which suddenly suggests itself is a new conception or a recollection. I told you the other day that I never wrote a line of verse that seemed to me comparatively good, but it appeared old at once, and often as if it had been borrowed."

One of the most singular idiosyncrasies of the class to which I have alluded is, that when they do drop across what may be called a "true bill," they forget, or will not take into consideration, the benefits their unfortunate victim has conferred on the art, however eminent he may be, or however much its existence may depend upon the discoveries he has freely given to the world.

Some of my greatest sources of self-gratulation are, first, that I never invented anything; secondly, that I am not capable of inventing anything; and, thirdly, that if I were capable, I have sufficient strength of mind to resist the infatuation. But if, by some intellectual lapse, I should ever be guilty of such impropriety, I should preface my description of the same with some such declaration that the writer I have quoted did a poem he once wrote, and in which he had used a simile which he thought might have been used before. As it may, perhaps, be useful to some of your readers—Mr. Claudet, for instance—who may be unfortunate enough to publish ideas they think may be of benefit to others, I subjoin it.

"I, therefore, in full possession of my native honesty, but knowing the liability of all men to be elected to public office, and for that reason feeling uncertain how soon I may be in danger of losing it, do hereby renounce all claim to being considered the *first* person who gave utterance to a certain simile or comparison referred to in the accompanying documents, and relating to the pupil of the eye on the one part, and the mind of the bigot on the other.* I hereby relinquish all glory and profit, and especially all claims from autograph collectors, founded upon my supposed property in the above comparison, knowing well that, according to the laws of literature, they who speak first hold the fee of the thing said. I do also agree that all editors of Cyclopædias and Biographical Dictionaries, all publishers of reviews and papers, and all critics writing therein, shall be at liberty to retract or qualify any opinion predicated on the supposition that I was the sole and undisputed author of the above comparison. But, inasmuch as I do affirm that the comparison aforesaid was uttered by me in the firm belief that it was new and wholly my own; and as I have good reason to think that I had never seen or heard it when first expressed to me, and as it is well known that different persons utter the same idea, as is evinced by that familiar line from Donatus—

'Pereant illi qui ante nos nostra dixerunt,'

now, therefore, I do request by this instrument, that all well-disposed persons will abstain from asserting or implying that I am open to any accusation whatever, touching the said comparison, and, if they have so asserted or implied, that they will have the manliness forthwith to retract the same assertion or insinuation."

Some such declaration as this would, I think, Mr. Editor, shut the mouths of the carping claimants who only open them to vent the detraction their misused memories enable them to splutter against those who, so far as having any intention of purloining the ideas of others, on which to base their own inventions is concerned, are as pure as Godiva was chaste. "The Old Photographer."

NEGATIVES WITHOUT INTENSIFICATION.

Sir,—In last week's News a very favourable mention was made of a series of views in the lake district, by Mr. Nelson K. Cherrill, and it is incidentally mentioned that these are examples of the method of obtaining pictures by one application of the developer, and that the skilful amateur who produced the picture is a believer in the desirability of such a method.

I was the first to publicly announce the proposition—that the highest class of negative should, and ought to be, thus produced, and, at a meeting of the Photographic Society, I stated my conviction that with bath, collodion, and developer suited to one another, such pictures ought, under almost all favourable conditions, to be obtained, and that if further final intensification were required, a modification of one or other of these three was desirable.

It is by no means a necessary logical sequence, that pictures not thus produced are held by me to be inferior, but simply that a needless expenditure of time and material is employed in carrying on two processes where one would fully suffice.

I think I must with regret allow that photographers have not taken to organic development, as I at one time hoped would be the case, and I attribute this entirely to the publication of erroneous formulæ and conflicting statements on the subject. It is now nearly twelve months since I commenced its use, and it would be difficult to over estimate the great value which I consider to belong to it. It has been used in my establishment under every conceivable variation—during the frosts of winter, and the heats of summer; during the dull, slow light of December, and the powerful actinic rays of June, for portraiture, copying, landscape, enlarging, and instantaneous views: in a word, for every conceivable purpose for which developers can be employed, and with unfailing and unvarying success. On very many occasions, recently, I have been favoured with the company of eminent photographers to witness a practical demonstration of its qualities, and all have admitted that the results are all that could be desired. With full printing powers, every tone, however delicate, is rendered; there is no possibility of fogging, and, the development being so much more under control than by other methods, there is an immunity from stains and spots rarely met with. No longer exposure is wanted, nor anything else differing in any way from the usual practice. The perfect cleanliness of the developer in use is no small recommendation, the stains on the hands being removed by a nail brush much more easily than those caused by pyrogallic acid. I believe much injury to the cause was done by the impression that these negatives should be developed to great intensity; this is wrong, as very harsh results are thus obtained; as the deposit is much more non-actinic than usual, a less degree of opacity than usual is desirable.—I am, &c.,

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* The more light you throw upon it, the more it contracts.

Samuel Fry.

PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Sir,—I am tempted, by the recent prominence given to the cases of photographic piracy, to address you again, conceiving that there is a certain confusion of ideas in the advocacy of photographic multiplication of engravings, which deserves to be pointed out; but, in renewing the subject, I distinctly desire to deal with it on the question raised by the *Daily Telegraph*, that "a national loss is suffered if free trade is not extended to this branch of industry," meaning thereby, that photographic copies ought to be permitted of all or any designs or engravings published, which, if not undertaken by the publishers themselves, might be issued by one or one hundred other persons, who would be expected to pay a royalty to the proprietor if looked after by him, and who if, when sought after, could be found. This line of argument would, however, lead to all classes of property, literary or otherwise, which enjoy protection under statute law as copyrights or patents, being exposed to the tender mercies of unprincipled men, who will always be found ready to trade upon the brains and property of their fellow-men. If it be urged that photographs are only small copies, why may not engravers also make small copies with as much show of reason? But these piracies are not confined to a small size, and in the Photographic News of June 29th you insert a notice of photographs undertaken by Mr. Annan, varying from 24 inches to 48 inches wide, thus showing the power the lens has of producing them of a large size. Taking this view of it, I cannot agree with those leaders of public opinion who advocate such doctrines, nor do I think they are themselves prepared to go to those lengths, or that they would meet with any general support in such views. The national loss likely to be experienced from such a course is the decadence of the art of engraving in this country, which the existing Acts of Parliament were granted to encourage and advance, and to seek to introduce "free trade in this branch of industry" is a fallacy which modern legislation has fully recognized, even in the Acts on trade marks, as the particular design attached to a tradesman's goods is held to be property by statute. The protection of the various Acts has, no doubt, answered the object of their promoters, as fostering the English school of art; and, leading to extended patronage, has created, in the print publisher, an agent for art and artist, in the same way that booksellers arose with the advancement of printing, and who, combining a taste for art with capital and business knowledge, may reasonably claim the benefit of the laws passed for the protection of those engaged in art-transactions, and in the maintenance of which artists are as much as ever interested. When, however, you find a public press advancing such arguments as you copied from the *Daily Telegraph*, but which, nevertheless, bear in them their own refutation, then, I contend, there is a misapprehension of the case, as established by known facts, that the writer cannot know of, and I will ask you to compare these passages:—"Even a fine work will not, we admit, be a favourite with the wealthy, if it be vulgarized;" and, "Connoisseurs would still purchase the larger and more direct copy, for sun pictures can never supply the place of large steel engravings." Here it is admitted, in one paragraph, that if you vulgarise engravings the wealthy will not purchase; and, in another, that they may be reproduced cheaply, and to any extent, and yet connoisseurs will still buy. Now, I hold that the first proposition is true, and that the subsequent assertion is proved by experience to be false; and the history of the modern print trade fully bears it out. Twenty-five years ago Mrs. Parkes, of Bowyer notoriety, expressed her intention and wish to make engravings as cheap as paper-hangings in rooms, and since that time, numbers of engraved plates have passed into hands who have nearly literally carried out such ideas, to the disgust of those who, trusting to the usual course of dealing, have paid large sums for proofs of many of the plates now exposed for sale on *roasting-jacks* at a few shillings each; but while the linear quantity of engraving exists, the impressions have been woefully debased. Further evidence is also afforded by the growing disposition of art patrons to purchase original water-colour drawings and pictures, which they feel cannot be copied or rendered common by photography or other means. You, sir, while ably supporting photographic interests, advocate its claims to be employed by the publishers in reproducing their engravings; yet experience shows to those concerned that such a course would lead to the depreciation of their more valuable property. If photography, in its present advanced state and future promise, can compete with the engraver in producing direct and pleasing copies of pictures, it is a legitimate result which may not be treated with contempt or dislike, and which would claim the protection of those very Acts which the legislature has considered, in the interest of the country, essential for the producers of the existing classes of art; and when you learn that Messrs. Graves do not take up one per cent. of the pictures annually exhibited, there is abundance of scope for their enterprize. But the *Daily Telegraph* considers the antagonism between the engraver and photographer as "deplorable for art education," and your opinion is not widely different; yet what is the real state of the case? The engraver has to devote much time to acquire excellence in his art, and his labour to produce a print from a picture is of long duration and continued anxiety; and if the publisher did not commission him and pay him while the work was in progress, he would often remain idle. And in the case of a large plate, the printing is a tedious job, and the prints may not be ready for some months, during which time the publisher is working to get his money back; and because he objects to the photographer, on purchasing an artist's proof, copying such proof and circulating it before it is possible to issue a common print, it is said that the existing relations are deplorable; and I will admit they are deplorable, if, by countenancing photographic reproductions, you destroy the older and more skilful application of talent, which must be the case if the present system is maintained. The antagonism only exists so far; if the photographer desires free trade in art productions, the engraver has no objection to his entering the field with him, provided he does it on equal terms, by going direct to the original picture. Much is said about "art education," but as I never heard of any person, be they painters, engravers, or publishers, undertaking the office of art educators without being remunerated for their services, I think the publishers may fairly object to being made scape-goats, that photographers may produce and vend their copies at prices which remunerate them, but which destroy the remuneration to the engraver or those engaged in publishing prints. I therefore contend that there is a confusion of ideas all through the arguments used; that neither painters nor engravers follow their professions, or the publishers devote their time and capital as "art educators;" but as the means of acquiring, what all desire to obtain, that wealth and position which is encouraged and enjoyed in our civilized state of society, nor would or does the photographer desire to take up the position of "art educator" if the remuneration for his productions, which he is worthy of, is to be withheld, or his talent and enterprise be made common spoil. You, sir, generally decline to give any opinion upon probable commercial results, yet you express a decided conviction in this instance that you are right, and those who have knowledge and interest to guide them are as decided in the policy of the opposite cause. Many causes have led to the present depression of the modern print trade, but the photographic copying of recent publications has done perhaps the larger amount of evil, offering, as it does, such facilities for their reproduction that you cannot discover the sources, for their name is "legion," and also by leading the public to estimate the original engraving, the result of years of labour and capital, by the wretched price of the pirated copies, produced at an insignificant expense; and the more the matter is impartially considered, the more you must deplore, not in the view of the *Daily Telegraph*, the state of affairs relating to the production and publication of fine engravings.—I am, sir, yours obediently,

J. S. W.

Talk in the Studio.

Cabinet Portraits.—We are glad to see the growing interest in the new size of portraiture, which promises to give a new impetus to photography. We have recently examined, at Mr. Solomons, a large stock of goods, especially designed for cabinet portraiture. Some exceedingly excellent albums, with a rectangular sight, neatly embossed round the aperture, for fifty pictures, ranging upwards from 10s. 6d. each. Lenses, mounts, frames, rolling-presses, &c., all designed for this size of picture. We are glad to note this enterprise amongst manufacturers and dealers; it only now rests with photographers to so influence their customers, to make the style a great success. In America the movement is also spreading, and Messrs. Anthony are making albums for the new size.

Disabled by Cyanide.—As we stated in our last, cases crowd upon our attention, illustrating the necessity of the existence of a photographer's relief fund. Another case is brought under our attention of an operator who has become disabled by the incautious use of cyanide. An appeal is made for assistance, to be forwarded to his employers, Messrs. Oldham and Cooper, of 17, Bennett's Hill, Birmingham. We mention the fact as strengthening the arguments for the speedy organization of some proper mode of examining and relieving necessitous cases; but we must adhere to the position we have been compelled to assume, of declining to reiterate private appeals in our pages.

To Correspondents.

J. B.—There are two modes of preventing cockling in mounting: one consists in making the mounting board as moist as the pasted print before placing the latter upon it; the other in avoiding as much as possible the use of moisture in the operation. The first plan is very simple, but it does not meet the condition of drying quickly, which you desire. Where quick drying is necessary, the following method is good. Use, instead of paste, glue: and let the glue have as little water as possible depending rather on making it thin and easy to spread by using it very hot, than thin with water. This method will cause very little expansion of the print, and, consequently, little cockling. If you bear in mind the cause of cockling, you will easily avoid it. The cause is, that the print, when moistened with paste, &c., expands a little; it is then placed on a dry mounting board in this expanded state. On drying, it contracts and pulls the board into the usual twisted and cockled form. A paste or solution of India-rubber is useful for mounting without cockling.

A. K. M.—There are various causes conducive to the splitting of the film in drying: dirty plates, damp plates (a most prolific cause during the summer), the imperfect quality of the collodion, and above all, especially when any of the other conditions are present, the necessity for prolonged intensification, piling up density on a thin image. The latter cause is a dominant one, for two reasons. In the first place, when the very free and prolonged application of nitrate of silver and pyro is necessary, it should be borne in mind that the film is subject all the time to the action of dilute nitric acid, liberated from the silver, thrown down by the developer. And next, the silver is piled *on* the film, giving the effect of a small piece of stout paper, mounted on a piece of tissue paper, which we know would tend to tear the latter. To avoid the necessity for prolonged development, or prolonged intensification, use a sample of collodion giving more density, or add a little pyroxyline to that in hand, use the organic iron developer, and expose fully, so as to avoid forcing the development; dry slowly and evenly. Be very careful that the plate is dry and clean. If still the tendency be present, treat the plate with a coating of dilute gum water before it is dry. The latter is generally successful, even when the other conditions are present.

C. W. H.—A manual of instructions will shortly be published. In the meantime, we think you may probably work out some experiments from the instructions published a few months ago in our columns, and from Mr. Cherrill's communications. The latter gentleman's experiences have been based on our published instructions, the details of his successful working being the result of careful experiment.

A. B. C.—The question of recovering the silver from waste is necessarily a very important one, and one very difficult to deal with. Very few photographers have the facility for reducing their own residues, and very few have the manipulatory skill and knowledge to conduct the operations successfully. Information on the subject abounds; but experience alone confers skill. To reduce the residues successfully, a proper furnace is necessary, we do not think that an ordinary fire-place can be converted into a suitable furnace. A good stove may be made to answer. For those whose business does not justify the arrangement for reduction on a proper scale, we can only recommend sending residues to a respectable refiner. Of course in such cases, as in many such cases, it is necessary to trust to the honour and honesty of others implicitly. 2. If too much common salt be added, a portion of the chloride of silver is redissolved, as it is slightly soluble in a strong solution of an alkaline chloride. Hydrochloric acid is better for the purpose than common salt. 3. Undoubtedly it is economical to recover the silver from old hyposulphite by means of liver of sulphur, even when the operations are even on a limited scale. 4. From your description the studio ought to answer exceedingly well.

Junior Photo.—The lens of 8 3-16ths inches focus will answer for cabinet pictures much better than that of 6¼ inches focus. The last mentioned maker is considered the best, and we should prefer the second-hand one you mention to the new one of lower price.

Brighton.—The addition of carbonate of soda, and sunning, ought to have cured your bath. Did you sun it thoroughly? Try the addition of cyanide. If you are not successful, you may, if you choose, send us an example. Reduce the strength a little, filter, and carefully remove scum from the surface.

W. E. (Pontypool).—Two or three prominent faults are present in your cards. The light is too directly in front of the sitter, which produces flatness; the negatives are under exposed, and, in some cases, over intensified; and there is a general want of sharpness. Whether the latter defect is the fault of the lens, or of bad focussing, we cannot say. Avoid front light, expose longer, and be very neat and careful in manipulation. Your backgrounds are somewhat wanting in neatness.

W. B. R.—The description of your photographic van stands over for a convenient occasion for insertion. The weather has been so bad for landscape photography that open-air apparatus has not demanded much attention.

Pallette.—The card enclosed has many good qualities. There is a little too much shadow on the face; this might be remedied by placing a white reflecting screen opposite the shadowed side of the face. 2. The side light of your new studio had better be brought down to the floor, but we should avoid a front window altogether. 3. It is quite possible, with care, to print two or three copies from an unvarnished negative; but the operation requires care. For such a purpose, only negatives produced in the usual way, and intensified with silver, will answer. Negatives which have been intensified with mercury, &c., would spoil the print if unvarnished.

Amateur.—We will make some inquiry. No paper was enclosed in your letter.

J. S. W.—Thanks. We quite agree with the remarks in your private note.

L. J. H.—The bronzed markings on excited paper, may be due to one of two causes: sometimes the formation and subsequent breaking of air bubbles in the silver solution, whilst the paper is floating on its surface, will cause such a defect; at other times it arises from an imperfection in the albumenized surface.

Richmond.—Natural skies are printed into landscapes by masking the sky during the printing of the landscape, and then masking the landscape during the printing of the sky from a properly selected cloud negative. You will find more particulars in Mr. Robinson's article on "Combination Printing," in our Year Book for 1864.

T. S. C. (Macclesfield).—It appears to us to be impossible to obtain a photograph of such a long scattered group, on such a small scale, so as to secure portraits in which each face shall be perfectly made out. A portrait lens was not the most suitable for the purpose, however, and the prints sent are from an under-exposed negative. If it were impossible to take the picture, as you state, from any other point, and if it were imperative that the figures should be placed in a long straggling line, it would have been almost better to have left the work unattempted. One of the new wide angle lenses would probably have answered best.

X. Y. Z.—Of course the addition of a solution of common salt to the printing bath will throw down a precipitate of chloride of silver, and it is the fall of the precipitate which generally takes with it the particles of colouring matter, and so clears the bath. If your bath is not cleared by this treatment it has probably suffered some accidental contamination, the nature of which we cannot suggest. Try next kaolin, or neutralizing and sunning. 2. The lime bath will give you blacker tones. The tone of print No. 3 is very good. The other prints, to secure good black tones, would require intenser negatives, deeper printing, and longer toning.

H. Taylor.—You may precipitate the silver from the mixed solutions you describe by plates of copper; but the operation is a slow one. Probably the most efficient will be to add liver of sulphur and precipitate as a sulphide, which must then be reduced in the furnace.

L. Bing.—We shall be at home on Monday next, at our residence, 36, Canonbury Park South, and shall have pleasure in seeing you.

Amateur (Stockton-on-Tees).—You seem to overlook the fact that the preparation and sale of carbon tissue, &c., is, with Messrs. Mawson and Swan, a matter of commercial consideration; and that as soon as they feel themselves in a position to issue its materials with advantage to the public and themselves, they are pretty sure to do so. Until they can do so satisfactorily and remuneratively, you cannot expect them to do so, and when they are in a position to do this they are not likely to delay; and they are, moreover, in the best position to judge of the prudence of the delay. The chief reason for the delay has been a desire to avoid risks of failure, and all the extensive and unpleasant correspondence following such failure. They have, therefore, preferred to obtain ample experience on all points before placing the matter in the hands of the public, and this they are doing in their own establishment. A manual of instructions is in course of preparation, and, when this is ready, we believe everything else will be supplied. The comparison you institute as to the rapid introduction of another new process and the materials for it, is somewhat unfortunate, as that process never became general, and has nearly ceased to be used. The carbon process involves a much greater revolution, and more valuable results.

W. Porsby.—We shall have pleasure in trying the varnish.

Frank M. Good.—Stereographs, Canterbury Cathedral, received, and shall have attention.

N.—The communication was duly received, and placed amongst a selection of papers, which, not being of pressing current interest, might await a convenient occasion for insertion. It shall receive our early attention.

Several Correspondents in our next.

All Communications for the Editor to be addressed to 15 and 16 Gough Square, Fleet Street, London, E.C.

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THE PHOTOGRAPHIC NEWS.

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THE ART CLAIMS OF PHOTOGRAPHY. RETOUCHING PHOTOGRAPHS, ETC.

We have so often reiterated the art claims of photography in these pages that little remains to be said on the subject, and we might, without impropriety, let the question rest. We should be very glad to do so: the unqualified denial, however, of all claim to art power in photography is so persistently maintained by some writers, that we are compelled now and then, as representing the art and maintaining its interests, to restate the arguments in its favour, or rebut some specious sophism intended to show that the production of anything like a work of art is impossible by photography.

The last number of the *Athenæum*, reviewing some photographs by Mr. Frith—under the heading "Fine Arts" by the way—in condemning the practice of retouching, upon which we shall have some remarks further on, grounds its objection to the practice on the fact, which it assumes, that photography is "not an art." It says:—"The idea of really gaining by the practice of touching upon photographs shows utter ignorance of the true value and sole merit of the results of that process, which is not an art, except in the eyes of those who have yet to learn that art is essentially a mentally achieved triumph, and so entirely independent of chemistry and machines, that even a suspicion of their intrusion is offensive to its lovers." We accept the general definition or statement of what art is here given, that it is essentially a mentally achieved triumph; and it will be easy to show, adopting this definition, that the denial that photography is an art can only arise from an entire ignorance of the degree in which a good photograph is the result of the mental power of the photographer, and not of the chemicals or "machines" which are his tools.

That photography is essentially a chemical or mechanical operation, and nothing else is the perpetual false assumption of those who deny its position as an art. They have no conception that the best results of photography are only produced by men of some artistic culture, and are really mental triumphs, not independent indeed of "chemistry and machines," any more than any other art is independent of the material forms in which it finds expression, but still, like other arts, dependent for excellence on the mind of the artist. It is related, that when the committee of the Society of Arts were deliberating the conditions of an artistic copyright law, Mr. Roger Fenton, on one occasion, insisted on the claim of photography to recognition in the Bill, as he saw a disposition to ignore it. "Photography a fine art!" exclaimed a well-known painter, "why it is entirely dependent on camera and chemicals." "In like manner," rejoined Mr. Fenton, "as the painter is dependent on pencils, colours, and canvas." The painter was still more irate at this comparison, and declared himself quite independent of these, exclaiming: "Why, sir, I could dip my finger in a puddle of dirty water or mud, and produce a picture with it on that wall which should express a thought or embody a sentiment, which everybody could understand or feel. The artist is not dependent upon the materials with which he shall work." All this was very true; but it proved nothing relevant to the question. The true artist is not dependent upon his materials; but whether he use mud with finger, carefully prepared pigments with a pencil, or he employ camera and chemicals, he will produce a work of art. The more plastic his materials, the more perfect will be his work, and the less will be his manipular trouble; painting is one of the most plastic of the arts, photography probably the least, as in it the artist is most bounded by material conditions; but as it undoubtedly demands the exercise of thought, and as its results can embody the thought and intention of the photographer, in such degree it is an art. Painting is not a fine art except in the hands of an artist; nor is stone cutting an art except in the hands of the accomplished sculptor. It is the mind of the artist which makes any manual operation an art; and photography, like painting, or sculpture, or music, or rhetoric, or acting, is a fine art when in the hands of an artist, a mechanical art when in the hands of a mechanical operator, a chemical art when in the hands of a chemist, and no art at all when in the hands of a bungler. But limited though the art range of photography may be, we must insist, with such pictures before us as the presentation prints of the North and South London Societies—to go no further that they owe their beauty chiefly to the fact that each is a "mentally achieved triumph," and that the agency which produced them is a fine art.

A word or two on the subject of retouching, upon which the writer in the *Athenæum* has some good remarks; but in which he evidently misconceives the general object of retouching. In a generally commendatory notice of Mr. Frith's landscapes, the writer severely condemns certain pictures as having been retouched. He says:—

"We thus write under the impression that several of the photographs before us have suffered from 'touching upon,' as it is called, under the delusion that any human hand can improve the beauty and lucidity of such transcripts, or add to them a quality of art proper. No brushes, however dexterously employed, nor pigments, however delicately wrought, can do otherwise than mar the right value of a photograph, by depriving it of that which is essentially its own.

"In 'Rydal Water' we have a virgin photograph. On the other hand, the thoroughly sophisticated example from the entrance to 'Bonchurch, Isle of Wight,' has been worked upon so entirely as to possess no more brightness than a drop-scene. It is inconceivable that the light of day alone could have left so dingy and unbroken a blot on the paper as the arm of the tree which crosses the front o this work, or rendered to the negative photograph anything so flat and dull in tone as the range of "back scene" cottages which recede by the roadside before us, and are matched by trees which have no more wealth of light and shade than diagrams possess. It is wonderful how far the blindness of the public to beauty will allow them to become possessors of "touched" photographs. It renders them unobservant of the tricks of operators who pander to vulgar notions.

"After being touched upon, a photograph is to us devoid of expression (*i. e.*, stupid, so to say); not merely a falsehood, but unbeautiful; yet lack of beauty is not, to our limited senses at least, an invariable accompaniment to lack of truth. It is the want of expression so observable in all these 'touched' transcripts that makes us wonder at their bare reception by many; still greater is this wonder at the delight some persons appear to receive from the sight of such things."

In reading these remarks with which, as applied to an obsolete class of pictures, we entirely agree, we cannot help thinking the writer is labouring under a very serious mistake. We do not know the especial pictures to which he refers; but "retouched" photographs in the sense employed, belong to the past. There was a time, when portraits retouched in black and white to a degree which entirely hid the photograph, were common. As a rule, these things were sad abominations, and the strictures of the critic in question would have been fitly applied to them. But in landscape photography such a thing was never common, and we cannot conceive what manner of landscape photographs these can be, that are "worked upon so entirely as to possess no more brightness than a drop scene."

The truth is, that the difference in brightness, beauty, and detail between what this writer regards as a "virgin photograph," and one which has been retouched, is probably entirely a photographic difference and not one due to retouching at all. It is generally an imperfect, under-exposed, photograph which the photographer is tempted to retouch; whilst the well-exposed, perfect, bright, and full of detail needs no such aid. The differences described, are chiefly those existing between a good and a bad photograph, in which retouching may have no part. The "dingy unbroken blot," which the arm of a tree in the foreground crossing the picture causes, is generally a result of under-exposure, and is not produced by retouching; the flatness and want of relief, want of expression, are all defects incidental to imperfect photographic conditions, such as bad light, under-exposure, fog, &c. When such defects are present, the photographer is tempted to modify, by slight retouching, the manifest imperfection. He can never make a bad photograph into a good one; but he may, if skilful, remove the glaring character of the faults; and as for complete retouching of landscape photographs for publication, no one would ever dream of it. As a rule, photographs are retouched because they are imperfect, rather than imperfect because retouched. This is especially true of landscape photographs: in portraiture a photograph may be technically good, and yet pictorially, and as a likeness, be improved by judicious retouching. The art of the photographer may be supplemented by a few touches from the painter without the production of that incongruity which uninstructed and affected writers sometimes represent as inevitable.

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INJURIOUS EFFECT OF CYANIDE.

We have once more to bring under the attention of our readers an instance of the injurious action of cyanide of potassium on the health, when absorbed into the system. In some of he cases on record, a certain amount of doubt has been elt, by some, as to whether the symptoms were the actual esult of the action of cyanide, or were only believed to be o by the patient. In the case we now bring before our readers, there is not room for a similar doubt, inasmuch as the patient was himself not merely a skilful photographer and educated man, but a physician, and we may fairly assume that his diagnosis of his own case is beyond impeachment. His letter is as follows:—

"Sir,—The photographic public are much indebted to you for the warnings you have, from time to time, given against the use—or rather abuse—of cyanide. I would not now venture to ask you to be so good as to give me space in your journal to bring anything personal before your readers, unless I thought the experience of an actual sufferer from the poison might be of possible service.

"I may premise I am a physician and an amateur photographer. Upwards of two months since, I was attacked by symptoms to which, for want of a better name, I applied the term of spasmodic neuralgia. At first I imagined the seizure to be be one of the abnornal phases of rheumatism of a nerve. The pain was most harassing, attended by twitches of the muscles, and succeeded, at irregular intervals, by numbness and pricking of the whole limb, including the left shoulder blade, arm, and fingers.

"Though an old photographer of some fourteen years' standing, I have never used cyanide in my dark room, always going into the open air to clear the iodide off the plate, well aware how injurious the fumes of the potassium salt are in a confined space; but it being indispensable that a professional man like myself should have a ready means of securing clean hands at a short notice, I have always freely applied a strong solution of cyanide for the purpose. Long immunity, I am afraid, is apt to produce recklessness; and as I had never, to my knowledge, before experienced any harm from it, I fearlessly continued the practice. My late sufferings, however, will induce greater care for the future.

"The pains, which at first were comparatively moderate, at length became so severe that I was obliged to take large doses of opium. I consulted several confréres, but they ignored cyanide as the cause of my malady, having never had occasion to observe any of its effects. To place the question beyond cavil, as an *experimentum crucis*, after having had a little relief for a few days, I went through the old process of washing with cyanide. For about an hour I thought I might be in error, but at the expiration of that time the pains, with the numbness, tingling, and spasms of the muscles, returned, and I had to endure my former symptoms in an aggravated form.

"I tried, in succession, various remedies suggested by my medical friends, and others that occurred to myself, but without any alleviation whatever. My days were torture, my nights worse. My general health, spirits, and appetite, hitherto good, began to suffer from the continued effects of opium, pain, and sleeplessness; in less than eight weeks I had lost two stone in weight, and my left arm was much reduced in size; and it is perhaps somewhat curious that arm was the only part affected.

"Under these circumstances I gave up for a short time al medicines: I was neither better nor worse. I then had recourse to a nostrum, supposed, I believe, to be composed of carbonate of lithium and sugar of milk, (Brahee sugar), which I had previously successfully employed in neuralgia and rheumatic gout. I took a powder four times a day. In two days my pains began to diminish, my health, spirits, and appetite to return, and in less than a fortnight from the commencement of the Brahee sugar treatment I was almost well; a slight numbness alone remained to remind me of my misadventure.

"On the question of the *modus operandi* of the Brahee it is needless here to enter. I am truly content with the result, and, if any of your numerous readers similarly affected are similarly relieved, I feel I shall have added my humble pebble to the cairn of accumulated facts so indispensable to photographers, and so sedulously built up by yourself and other able contributors.—Your obedient servant,

"*Exmouth, October 18th*, 1866. R. M. S."

THE NEW PRUSSIAN LABORATORIES.

An elegant volume has just appeared, descriptive of the new chemical laboratories, now in course of erection by the Prussian Government at the Universities of Bonn and Berlin. Dr. A. W. Hofmann, to whom has been entrusted the design and supervision of their construction, gives a detailed account of the new buildings, accompanying his explanations with architectural plans and illustrations reduced by means of photography from the original drawings.

The progress of this magnificent work, which will cost in the aggregate upwards of £100,000, is watched with interest by several foreign governments, and our own Council of Education has not been behindhand in acquiring full information respecting the new chemical establishments. It is even hinted, in the course of the published correspondence before us, that similar institutions are likely to be founded in connection with the Department of Science and Art at South Kensington. Certain it is that not even England can venture to dispense with the mighty aid and giant resources flowing from an earnest cultivation of the most practical departments of Experimental Science; and we should be rejoiced to know that the successful labours of Dr. Hofmann, now being exerted in favour of a foreign State, will ultimately have had the effect of awakening more active and deliberate measures for the encourgement of science, not only in the Universities, but in all the educational establishments of this country.

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COLLODIONIZED PAPER.

"La Lumiere" gives a short notice with reference to the employment of M. Marion's collodionized, iodized, and waxed paper. This paper, which is very suitable for enlargements, is made in endless rolls 57 centimetres broad, or in sheets measuring 44 by 57 centimetres. Before use, it should be carefully wiped on both sides with a cloth, to remove any dust or other impurity which may have become attached to the wax, either during its manufacture or afterwards. The sensitizing bath is made up in the proportion of 70 grammes of nitrate of silver and 100 grammes of glacial acetic acid to 1,000 grammes of distilled water; the paper is immersed in it, and a brush is drawn to and fro over the surface, to cause the liquid to impregnate more readily, and to prevent the formation of air-bubbles. After remaining in the sensitizing bath for five minutes, it is well washed, to remove any solid particles of iodide. It is then dried between two pieces of filtering-paper, and is ready for use.

The exposure required is from six to eight minutes in a bright light, and fifteen to twenty in a dull one. The developing is proceeded with in the same manner as the sensitizing, the bath being composed of 1,000 grammes of a saturated solution of gallic acid, and 20 to 30 grammes of aceto-nitrate of silver. A few minutes are required to develop the print, which should possess intense blacks and very modulated half-tones. The print, when sufficiently developed, is taken from the developing bath, carefully washed, and then fixed in a solution of 20 grammes of hyposulphite of soda dissolved in 100 grammes of water. The fixing of the print is completed when the whites of the picture, which before were opaque and of a yellowish hue, have become perfectly white and transparent. After being thoroughly washed, the print is dried, and finally heated to a high temperature for the purpose of remelting the wax. It is then ready for employment in the pressure-frame for the production of positive prints.

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PHOTOGRAPHY IN BRUSSELS.

A correspondent writes:—"Photographers have been very busy in Brussels during the last week. Portraits and groups composed of English Volunteers, either by themselves or in company with members of the *Garde Civique*, are seen in every photographer's specimen case. Two of the more eminent photographers, MM. Ghémar and Nysten, have been appointed by the Committee of the *Tir National* to execute portraits of the winners of two of the principal prizes, to be presented gratuitously to the fortunate prize-holders. These portraits are to be life-size, touched up with crayons, and varnished, and are valued at £5 (125 francs) each. I paid a visit to the studio of MM. Ghémar fréres, the photographers to the King, who were kind enough to show me the whole of their arrangements. Their enlarging apparatus is fitted up in a building a little way out of town, but I was unable to see it in operation, as, owing to the unusual press of business, the whole of the staff were required for taking portraits at the main establishment in town. Here they have three studios, two for taking portraits and one for groups. They were very ingeniously fitted up, care being taken to avoid anything bright and new in the way of furniture, curtains, &c. The studios were differently situated as regards lighting, and provided with white and blue gauze curtains, so that the amount of light might be regulated with the greatest nicety. Round the room were many little ingenious arrangements, which were, however, merely applicable to the room in which they were situated. The printing was carried on in the ordinary manner. I was shown a photograph of a group composed, as I was informed, of some two thousand figures taken at the *Tir* during the visit of the King. It was a very fair one, although somewhat under-exposed, taken on a 20 by 15 plate, with a good light, in ten seconds. Another picture of the same size was a much finer production. It was a group of all the British Volunteer Officers, taken in the Palace Gardens after the Levée. The plate was exposed for twenty to thirty seconds at three o'clock in the afternoon. A small shooting-tent had been erected behind the Palace, and the officers were requested to group themselves round it. While M. Ghémar and his assistants were preparing the plates, some of the officers, thinking the tent very much in the way, and liable to interfere with the uniformity of the group, began to pull it down, but were luckily prevented from doing so by the timely appearance of M. Ghémar, who explained that it was for the very reason of breaking up the group and making the photograph more picturesque that he had been at the trouble of erecting it."

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A NEW SUBSTITUTE FOR COLLODION.

M. Persoz, fils, has recently discovered a method for obtaining a material possessing the same characteristic qualities as collodion. *La Lumiere* says: "This new substance is produced by dissolving silk in a suitable solvent, and then separating the latter by means of dialysis. If the film be of a certain degree of thickness, it assumes on drying a golden tint, but this would no doubt be scarcely perceptible in a thin film, such as would be used in Photography.

"The solvent chosen by M. Persoz is chloride of zinc, which, when kept at a warm temperature, readily dissolves the silk, but if the solvent be not warmed the silk takes a much longer time to dissolve. Before employing the chloride of zinc, it is heated with a small quantity of oxide of zinc, in order to neutralize any excess of acid in the chloride, and then filtered through a piece of fine cambric to remove the superabundant oxide.

"To separate the chloride of zinc from the solution of silk, M. Persoz has recourse to Professor Graham's method of dialysis. The apparatus for dialysis, which is a kind of seive, is made by means of a broad strip of gutta-percha, bent round and cemented in the form of a cylinder, at one end of which is fixed a disc of parchment to form the bottom. The apparatus is floated upon a vessel of water, and the silk solution, previously diluted with water to the consistency of collodion, is poured into it. The chloride of zinc percolates through the moistened disc of parchment, and mixes with the water in which the apparatus is floating. In a few days the whole of the chloride of zinc will be found to have become separated from the silk solution, but the presence of a slight quantity of the chloride in the material is of no great consequence, as it merely gives rise to the presence, in the sensitive film, of a minute quantity of chloride of silver.

"Although M. Persoz does not mention the fact, there is no doubt that a dry film of this substance would be quite insoluble in water. Its employment is very simple. It is first iodized by mixing with it an aqueous solution of iodide, and then dried and sensitized; the exposure and development are conducted in the ordinary manner."

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NEW EXPERIMENTS ON THE SENSIBILITY OF BROMIDE AND IODIDE OF SILVER.

BY DR. H. VOGEL.

The following experiments will show how much the sensitiveness of bromide and iodide of silver varies when nitrate of silver is present, and how the pure iodide of silver, generally judged as more sensitive under certain circumstances, proves much less sensitive than pure bromide of silver. It is a notorious fact that bromide of silver in the dry processes often proves more sensitive than iodide of silver. But in that process no nitrate of silver, but any organic substance, is present; wherefore the circumstances are quite different from those in my experiments.

In order to test the relative sensitiveness of both of these salts, I procured a merely iodized collodion, and one containing only bromide; and for getting a judgment of the sensitiveness of chloride of silver, a simply chlorized collodion too.

I.—Iodized Collodion.

Iodide of cadmium	1 gramme
Alcohol	30 grammes
Plain collodion (2 per c. cotton)	90 ,,

2.—Bromized Collodion.

Bromide of cadmium	I gramme.

Other substances as above.

3.—Chlorized Collodion.

Chloride of cadmium	½ gramme.

Other substances as above.

(The quantities of salts here taken nearly agree with the different equivalents of each salt.)

By each of these three sorts of collodion a plaster bust, veiled with a black drapery, was taken. For preparing the plates, two baths of 10 per cent. of nitrate of silver were used. The first bath was mixed with a little iodide of silver, and only employed for sensitizing the iodized collodion (No. 1). The second bath, which served for sensitizing the bromized and the chlorized collodion, contained no iodide of silver.

Apparatus.—Dallmeyer's stereoscopic camera.

Exposure.—One or two minutes.

Developer.—Sulphate of iron, 3 per cent.; acetic acid, 3 per cent.

Results.—Chlorized collodion gave no traces of an image. Bromized collodion gave a distinct but weak and very soft image of the white plaster (only the dark shades were not visible), no mark of the black drapery. Iodized collodion gave an intense image, both of the bust and of the drapery, but it was hard, and the outline not clear. By these experiments the greater sensitiveness of iodide of silver as opposed to that of the bromide or chloride of silver is shown.

The condition of the bath, however, is here to be carefully considered, for the circumstances are quite different if bromized collodion be not prepared in a pure bath, as above, but in a bath that contains iodide of silver, as an ordinary bath for negatives (*vide* my paper in the present volume of the Photographic News, page 400).

I then examined the effect of a pyro developer on bromized and iodized collodion. Two collodions were employed, which were iodized twice as much as those specified above.

Developer was—

Pyrogallic acid	2 parts
Acetic acid	2 ,,
Water	100 ,,

Exposure, one minute; other circumstances the same as above.

The result was the same as with the iron developer; the plates, however, appeared much more dense. Bromized collodion gave an image only of the white plaster, and some marks of the black drapery. Iodized collodion gave a most intense image, with much detail in the black drapery. For the sake of completeness to both of them, a mixed collodion was compared:—

Bromized collodion...	1 part
Iodized collodion	1 ,,

The image was less intense, but more soft and harmonious than that of iodized collodion, and with details in the black drapery. The influences of the silver bath, which, varying so much in its composure, thereby modifies the results, induced me to employ, in the following experiments, a silvered collodion, like that proposed by Sayce. The results I gained were strange and interesting. Three collodions were procured:—

a.—Collodion with Iodide of Silver.

Iodide of cadmium	1 gramme
Alcohol	15 grs. (by measure)
Plain collodion	45 ,,
Solution of nitrate of silver (I part salt, I part water) ...	4 grammes.

b.—Collodion with Bromide of Silver.

Bromide of cadmium	I gramme

The other substances as in *a*.

c.—Collodion with Bromo-iodized Silver.

Iodide of cadmium	½ gramme
Bromide of cadmium	½ ,,

The other substances as in *a*.

(We remark, that in all these collodions the quantity of silver salt is twice that of iodizing salts. The mentioned proportions of the quantities of iodide of cadmium and bromide of cadmium approximately answer the equivalents—

Iodide of cadmium $(\text{Cd I}) = 183$

Bromide of cadmium $(\text{Br Cd} + 4\ \text{Ho}) = 172$;

and the equivalents of the silver salt being 170, it is evident that each of the collodions contained, besides iodide and bromide of silver, at least one atom of free nitrate of silver.)

The collodions were prepared in the following way:—

The iodizing salts were dissolved alone in alcohol, and filtered. One part of the filtrate was added to 3 parts of plain collodion, and the mixture put aside for forty-eight hours; of this, 60 grammes (measured) were poured, during shaking, into a bottle which contained exactly 4 grammes of silver solution (1 part salt, I part water). After shaking for ten minutes, the collodions rested one hour, and were then made use of.

Sayce used in his experiments a silver collodion which was washed before exposure, and thus purified from free nitrate of silver. He developed the plate with a solution of iron and of silver. But my intention was, to learn the effect of sensitive salts in the presence of free nitrate of silver. For this purpose, the plates were exposed, without washing immediately after being coated with the silvered collodion. Since the film contains alcohol, it does not allow the aqueous iron developer entering, and therefore I employed an alcoholic pyrogallic developer, composed of:

Pyrogallic acid	2 parts
Glacial acetic acid	2 ,,
Alcohol of 80 per cent.	100 ,,

(Without alcohol, this developer is composed like those mentioned above.) This developer flows very easily over the plate. The appearance of the plates prepared with bromide and iodide of silver was remarkable before exposure. Whilst in ordinary wet process the film of the iodized collodion appears much more thick and cream-like than the film of bromized collodion, it is quite the contrary if the silvered collodion be employed. The film with bromide of silver was the most thick and cream-like; more transparent appeared the bromo-iodide film; and the most transparent was the pure iodide of silver film. The latter had a strange yellow-grey appearance, which surprised me so much that I supposed I had made a fault in preparing, and prepared, therefore, all collodions anew. Still more remarkable, however, was the behaviour of the plates after exposure. The object employed was, as before, a plaster bust, covered with black drapery; exposure, with equally good light, one minute with Dallmeyer's portrait lens.

The film with bromide of silver gave a delicate, soft image of the plaster bust, quite as detailed as with ordinary wet process (*vide* above); no mark of the black cloth. The film with bromo-iodide of silver gave a similar but weaker picture. The film of iodide of silver gave scarce a trace of an image, only the lightest parts of the plaster bust appeared in a weakly reflected light.

These experiments were repeated several times, and always had the same results. We observe by this that the scale of sensibility is directly inverted. Bromide of silver in the presence of a small quantity of nitrate of silver is much more sensitive than iodide of silver. If both of them are combined, the behaviour of the mixture is a midway between the two.

Strange as these facts may appear, their explanation is, nevertheless, more easy than may be supposed at first sight. The abnormal appearance of the film is an indication that there is formed another body than exists in ordinary wet plates prepared with an aqueous silvering bath. Iodide of silver notoriously forms very easily two crystallizable combinations with nitrate of silver—

$Ag\,NO_5 + Ag\,I$ (Schnauss).
$2\,Ag\,NO_5 + Ag\,I$ (Risse).

These combinations are decomposed by water, iodide of silver is liberated, and nitrate of silver is dissolved. The iodized silver collodion above-mentioned, containing more than one equivalent of free nitrate of silver, the combination $Ag\,O\,NO_5 + Ag\,I$ may be formed with ease; and that this combination is indeed in the collodion film is proved beside by its abnormal appearance, by the effect of water on it, which decomposes it by liberating iodide of silver. By immersing the film into water, its appearance immediately is changed, becoming greenish-yellow and more dense. The film with bromide of silver, on the contrary, changes its appearance not at all in water. We consequently are here concerned, not with a film of iodide of silver, but with a film of iodo-nitrate of silver; and that this is less sensitive than free iodide of silver cannot seem strange, since notoriously the chemical behaviour of the compounds of a combination allow no conclusion on the behaviour of the combination itself. For characteristic instance, we mention the strange behaviour of chloride of silver in the presence of chloride of mercury. Chloride of mercury is sensitive to light, chloride of silver sensitive too, a mixture of both of them remains unaltered in light (Gay Lussac).

My experiments on this subject are not yet terminated; the later results shall be published in due time.

ON THE DIFFERENT SENSIBILITIES OF IODIZED AND BROMIZED COLLODION IN DIFFERENT INTENSITIES OF LIGHT.

BY DR. H. VOGEL.

It is a well established fact that pure iodized collodion is more sensible to strong light, bromized collodion more sensible to weak light. For this reason the first gave, in one of my experiments, with a portrait lens, a hard image of a plaster-bust, with black drapery, without details in the darker parts.

In regard to that, I previously believed that pure iodized collodion was to be preferred for reproductions of drawings, in order to get a thick negative and clear lines. Recent experiments have shown, however, that this conclusion is not to be admitted for all cases. For the experiment, I took a copy of a drawing with Dallmeyer's triplet (smallest stop), on pure iodized and pure bromized collodion, and the result was, that the image on bromized collodion, was, under the same circumstances, much more intense than that on iodized collodion. This result seems to be in contradiction to those observed in another article, in taking a plaster-bust. But this contradiction is removed very easily and simply if we take into account the intensity of light of the images. I used for the experiments above-mentioned, a Dallmeyer's portrait lens. The portrait lens gave a very light, strong image of the white plaster; the stopped triple lens, however, gave an image of the white paper of the drawing, the intensity of which was extraordinarily weak, evidently more weak than the image of the black cloth, focussed with the portrait lens. Though in taking a drawing with an objective with small stop we have to deal with a light, weak image, and therefore the bromo-iodized collodion must give a more intense image than the iodized collodion. This circumstance shows how much the brilliancy of the image in the camera is to be considered, when judging of the effect of a sensitive preparation. A recent fact illustrates this point. Some months ago I found that a small quantity of baryta added to the silvering bath increased remarkably the intensity of the plates in the light parts. The object was a new plaster-bust, the apparatus an objective for portraiture. The plates appeared somewhat hard, thereby inducing Mr. Korn to try, for reproductions, a bath which contained baryta, hoping to get a thick negative; he experienced, however, quite the contrary. The image with the small stopped triple lens became much less intense than with the ordinary bath, and the reason is, that I operated with a rapid objective and an intensely lighted picture, whilst he operated with a very weak one. It would be of great importance to be in possession of an apparatus fit for exactly fixing the actinity of camera images, only by means of such an one we should be enabled to make numerical accounts on the sensibility of a preparation, by which conclusions might be made with certainty.

PAPER TURNING YELLOW.

Mr. F. B. Gage, an old and experienced photographer, writes on this subject to the *Philadelphia Photographer* as follows:—Having prepared my own albumen-paper ever since it was first used in the art, I was for a long time troubled with it turning yellow, measles striking through to the back of the paper, and all the category of calamities incident thereto. Various and numberless were the expedients resorted to to dislodge this enemy from his position; but all my endeavours were of only partial avail. At last, however, I became convinced that the yellow stains were caused by fermented acid in the albumen used; but I found Mr. Acid so strongly intrenched in his stronghold that I was unsuccessful in my attempts to rout him by any direct attack. As a last resort, I concluded to flank him, "a la Grant," and take him in the rear. For that purpose I prepared a solution, as follows:—

Water	20 ounces
Sal Soda (washing soda) ...	60 grains
Chloride of ammonium	120 "

I floated the paper, back down, on this solution five minutes, or until the paper laid flat, and the albumen surface became moist and soft. I then hung it up to dry, after which it was silvered, fumed, printed, and toned as usual.

In that way, the sal. soda neutralized the acid, and the paper would keep some days very white, unless it was very hot. There is some work in this, but a good return is made in the quality of the prints and the paper saved. Of course, it is necessary to use some care, and not to allow the neutralizing solution to come in contact with the albumen, as it immediately washes it off. If the paper is already heavily salted, the ammonium can be omitted from the neutralizing solution. All albumen-paper before silvering should be smartly rubbed on the albumen face with a clean piece of cotton flannel. The flannel will absorb and convey away a thin film of animal oil, which deters the silver from taking readily. Any of your subscribers who are troubled with the yellows, by adopting this "dodge," will very soon discover the fact that their old enemy is really dead and buried.

After fourteen years' successful practice in my old gallery, I have just moved into a new one. I occupy one entire floor, forty-two by seventy-two feet. My skylight-room is twenty-eight feet square. I can operate on three sides of the light, east, south, and west, and I get a fine light at all hours, rain or shine. Several "well posted" photographers, who have seen it, haexpressed the conviction that I have made a strike, not exactly in oil, but in light. My own opinion is, that it is not excelled. I can give you a description, and perhaps a drawing of it, if desirable. The cause of the paper turning yellow is fermented acid. Lest any one should fall into error in regard to the soda, I would say that the amount given in my formula is not to be taken as the amount that is best at all times, and with all papers. The amount of fermented acid is very different in different samples of paper. Sometimes one grain of soda to the ounce of water is enough to prevent the yellowing; sometimes five or eight is none too much. Enough to neutralize the acid is necessary. I have been using, for a long time, a sample of paper that required only three grains of soda to each ounce of water. To-day I am getting some choice results with another sample, using a twelve-grain solution.

This filling the pores of the paper back of the albumen with carbonate of soda, which, after silvering, is rendered more or less into carbonate of silver, gives pictures of great depth, which, when properly toned, never sink in the hypo bath. There is enough alkaline when twelve grains are used; so that if the gold is nearly neutral, there is no need of using any alkaline in the toning bath, and the bath decomposes less rapidly than is usual. Less fuming is necessary, for obvious reasons, and the ammonia for fuming may be reduced largely with water. I use silver, with a fifty-grain solution, from three-quarters to one and a half minutes, according to the thickness of paper. I use a mixed solution of plain and ammonio-nitrate to four of plain.

Nearly all plain papers are sized with sizing containing more or less fermented acid. The same treatment will prove beneficial in keeping the lights pure while printing. A knowledge of the course and remedy for paper turning yellow is of great importance to the practical photographer, as it gives him control of his printing, and is a means of getting very much better effects.

LANDSCAPE PHOTOGRAPHY.

BY PROF. TOWLER.*

The present summer has again drawn us into glens and ravines, upon cliffs and dangerous precipices. The trip has increased our experience, from which additional knowledge has been derived; our readers shall have the benefit of the conclusions.

All our arrangements for working with the wet process are very easy and convenient; besides this, there is a determination—an obstinacy—in our mental organization, that necessitates us to finish what is undertaken; we therefore selected the *Wet Process* for the photographic campaign.

The tent we use was described in the Almanac for 1865; it has undergone no change since that time. It weighs only a few pounds. We carry it, when on the tour, upon the shoulders; by this means the two hands are at liberty. In the right hand we carry a pail, which contains the following articles:—

1. A water-tight porcelain silver bath.
2. A bottle of cyanide of potassium.
3. A tin case containing twenty-four weighed packets of the iron salt.
4. A pint bottle of alcohol.
5. A pint bottle of collodion.
6. A four-ounce vial of ether and alcohol in equal proportions.
7. A two-ounce vial of acid gelatine.
8. A fifteen-grain vial of chloride of gold.
9. A two-ounce vial of a saturated solution of bichloride of mercury.
10. A two-ounce vial of acetic acid.
11. Three four-ounce beakers for containing the developer, the fixing solution, and water.
12. Two ounce vials for intensifying.
13. One glass funnel, filtering paper, one evaporating-dish, and an Argand lamp.
14. Two ounces of nitrate of silver.
15. One towel, and glass-cleaning cloths.

In the left hand we carry as follows:—

1. One stereoscopic camera, lenses, plate-holder, and focussing-cloth in a leathern case.
2. Two sets of light tripods for the camera and tent.
3. Case for containing twenty-four glass slides.

These three packages are compactly combined in a linen cloth, and bound together with a leathern strap, by which they can easily be carried.

Furthermore, we wear a pair of cavalry boots, perfectly water-tight; this part of the accoutrement is a *sine qua non*, if health is an important consideration.

In addition, and finally, our better-half frequently sticks into a side pocket, or into the pail, a pint of the *creature*, to keep cold out of the stomach; this we have frequently found to be the best developer.

Thus accoutred *cap-a-pie*, nothing more than a monkey was wanted to complete the outfit for a travelling concert or an organ-grinder. In fact, we have been taken more than once for one of the Cisalpine artists that perambulate our territories, and have been requested to strike up the Carnival of Venice or the Marseillaise. So great must have been the resemblance, that in the Albany entrance into the cars, I was sternly prohibited by the conductor. "Stop, old fellow!" cried this important personage, as we were attempting to raise ourselves upon the platform by a sort of superhuman jerk; "Stop, I say! You can't go in there, old fellow, with your monkey and those traps of yours; move behind into the baggage waggon, and take a seat on a barrel; or you may deposit your load there, and then come and sit with Christians." All remonstrations and representations were in vain. As it happened, and fortunately, we were not friendless; we descried one of the directors of the Central Railroad, who had a hearty laugh at our dilemma, and rectified our trouble. The conductor very obsequiously, after the director's intercession and introduction, assisted us into the cars, and, with much loquacity, apologized for the ludicrous mistake.

The dry-plate photographer may escape such a misadventure; and this, of course, is an argument in favour of dry plates; for very few gentlemen (and we think ourselves are) would like to be mistaken for either an Italian or Bohemian with an organ and monkey.

The bath and collodion were both carefully filtered before we started. The developer and fixing solution are prepared on the ground. After arriving at a good location, the tent and camera are mounted each on a tripod. It is best to place the tent under a tree, or anywhere in the shade. The pail is next emptied of its contents, and filled with water. The bath is next transferred to the tent. The plate-holder is placed also in the tent. The developer is then mixed; the salt, being already finely pulverized, soon dissolves in the requisite quantity of water, to which are added the acid gelatine and alcohol. The cyanide is now dissolved in water; the water-bottle or beaker is filled with water; and a small vial is filled with collodion. These four are placed on the right side of the tent, in rotation as follows:—

Developer, water, fixing solution, and collodion; they always preserve this order. The plate-holder is suspended on a sort of wire cage or on brackets on the opposite side; there is also a similar cage for holding a cleaned plate.

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* *Humphrey's Journal.*

To make all these arrangements, when once on the ground, requires above a quarter of an hour or twenty minutes.

If you have an assistant, the labour, naturally, is divided, and becomes much more agreeable. In this case one person superintends the camera, and the other the tent.

During our late tour we have had *only one-half day* in which the sun shone brightly; for several days there was a drizzling rain, more or less, with intermissions; but the sky was clouded all the time, with the one single exception above mentioned. You will, of course, conclude that our trip has been nearly a total failure. Far from it; our success was never greater; and we have come to this fixed conclusion and determination, never to attempt taking a photograph again in direct sunlight, where the contrasts are very great. The determination is a wise one; for supposing you are in a deep and narrow ravine, thickly wooded with pines, tamaracks, oaks, sycamores, and all the variety of forest and mountain dark verdure, with here and there bold escapements of limestone, slate, and sandstone, towering perpendicularly four or five hundred feet up to the sky, presenting whitened and variegated patches to the full blaze of the sun; all this looks very grand, very charming, and excites your photographic enthusiasm. Now think a moment before you focus your lenses upon this enchanting scenery. What do you expect you can do? Let us examine the matter.

The lenses will take a picture of a well-lighted building or open scene, with the smallest stop, in eight seconds. The cliffs in this ravine are well-lighted, brilliantly, superbly illumined. nothing could be grander; therefore an exposure of eight seconds will be abundantly sufficient.

This is conclusion number one.

Now let us cast our eyes upon the base of the ravine, as also upon the opposite side of the glen, which rises more gradually, and is covered with all the varied greens of an artist's whim—there is more shadow than illumination in these expanded masses of verdure; below it is almost dark—what length of exposure is required so as to get any detail? The illuminated parts will require twenty seconds (this we know from experience with the lenses), whilst the darker parts cannot be depicted at all, with any sort of definition, in less than one minute and a half to two or three minutes.

This is conclusion number two.

Now, in order to get a photograph of the whole ravine, what exposure do you intend to give? If you expose eight seconds, the green covered sides of the glen and the base will be perfectly black in the print; not a single tree will be visible; your photograph will be a horrid failure, a quantity of rocks without their comparisons and their delightful verdant investiture.

On the other hand, if you expose two minutes, the trees on the declivities of the ravine, the dark masses of foliage at the base, are all well defined in the print; but the crags, the water, the stones, and the illumined shrubs on the precipices are solarized: the print looks as if covered in the parts just mentioned with snow; and every one, not initiated in photography, will ask—and very properly, too—if it was snowing when you took the photograph?

Such prints are very common; but they are failures. It would be but waste of time to attempt getting an artistic photograph of the scene in question with such an illumination; for if you were to average the exposure, one part would still be solarized, whilst the other would be void of detail; the print would be a black and white picture without middle tints.

If the ravine happen to lie in a direction so as to receive the direct solar light upon those parts which are least impressionable on the collodion film, there might be a possibility of obtaining a respectable photograph of the scenery by simply waiting until the sun had got round into the proper direction. Wait, therefore, and do the best you can do under the circumstances.

But we will now suppose it has been raining, and the rain has just ceased, but the heavens are covered with clouds, and the sun is invisible. The leaves on the trees glisten brightly; the whole scenery is now visible, more minutely seen in detail than it was during the time when it was suffused with the full sunlight. The illumination is soft and equal, as if the ravine were located under a well-arranged skylight. Examine the scene on the ground-glass—how visible and soft is the picture, how clear and distinct every detail! The scene is really charming; it is quite artistic.

What exposure shall we give?

Twenty seconds, more or less, will be right. Develop the picture, and behold! you have secured a jem. There is all the detail which your lenses are capable of giving, and all the variations of light and shade which difference of distance provides; no parts are solarized, no part is black and devoid of its natural structure and delineation.

Perhaps this result is accidental.

Not at all; it will occur invariably, whenever the atmosphere is clear, and the sky is clouded or the sun obscured; and you cannot possibly obtain a perfect photograph of a landscape with any other sort of illumination.

This sounds dogmatic, but it is true.

What other conclusions did we derive from our late excursion? you ask. We will tell you. Use a ferro-gelatine developer, and develop long enough (and you can do so) until you obtain all the intensity needed. We use gelatine solution in the silver bath with the acid which is dropped in to acidulate it. There is a beautiful bloom on the negatives prepared in this way, and fogging is out of the question; it did not occur once in ten days. It may happen that the exposure has been slightly too short, and a second negative cannot be taken; or that the exposure was right, but you failed to develop long enough, out of carelessness or mistake in judgment. In this case, and especially in the latter division of the case, the negative can be intensified and made as good almost as if it had received the necessary opacity by the first intention, as it is called in surgery.

For this purpose we carry the chloride of gold, the bichloride of mercury, and the acetic acid in the pail; these substances, it is true, may be left at home, and the photographs may be intensified in the laboratory if thought proper. It is quite easy, however, to perform the operation in the field; and then the negative is complete. Whilst the plate is still wet, flow it with a dilute solution of the chloride of gold, until the film assumes a uniform bluish tone; wash the plate, and then pour over the film the following mixture:—

Water	6 drachms
Saturated solution of bichloride of mercury	1 drachm
Acetic acid	1

The proper amount of intensity will soon be acquired. Wash thoroughly, and dry the plate spontaneously in the sun.

Almost all negatives become brighter by this treatment, even although they may be already sufficiently intense. But in this case the solutions are kept upon the film only just until the desired tone is obtained.

It is always advisable to take duplicates of scenery, one of which is intended for solar enlargements. We have given instructions in a previous number of the Journal how to take negatives for the solar camera.

For this sort of work, you must use the smallest stop, and focus with the utmost accuracy. You will be delighted with the results. One-half of the stereoscopic plate (8 by 4 inches) will be suitable for enlargement to 17 by 22 in one of Shive's Solar Cameras, which we use with so much ease and success.

Furthermore, and finally, we recommend you to filter your collodion and silver bath every evening after your day's work is over. On one occasion we forgot to filter the silver solution, and the next morning every negative was spoiled with a deposit of specks of reduced silver on the upper part of each plate. This was caused by a scum on the surface of the solution, which attached itself to the collodion film just when the plate was drawn out. The scum to which we allude looks like gas tar on water; it is iridescent. After filtration the trouble disappeared.

Boil the solution at the end of three or four days' hard labour, and add fresh silver as the bath becomes exhausted. Be generous with your silver; there is nothing gained with weak baths.

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THE TALE OF TWO GIANTS.*

A long while ago the sleepy world was awakened by a loud blast from a trumpet. Such a sound they had never heard before; and when they found that it came from a huge giant who had made his appearance in the midst of the people, they trembled and were much afraid. The name of this giant was *Delusion*; and ever since, to this very day, he has been blowing his trumpet and performing great works, causing sorrow and joy, pleasure and pain, admiration and ridicule. He made conquests wherever he went, and, strange to say, carried neither sword nor spear. A great number of brushes and pencils, and sundry beautiful colours, with a girdle of canvas and helmet of wood, were his only weapons, and with these, then, and ever since, he has conquered his foes, and made them bow before him and admire his handiwork. By his mighty power he could delude the most skilful and sceptical. With his great arms he would fasten up a huge piece of canvas before the eyes of the people, setting himself to work for a while, would mix his mysterious colours, and then call the people around to look at him. "See!" he would say, "Do you see yonder mountain-top, with the winding silver stream leaping down its rocky sides, the chamois springing from crag to crag, the speckled trout playing in the quiet pool at the foot of the fall, the school-boy fishing patiently under the bridge, the old miller leaning over the hand-rail, and the peasant mother resting with her little ones under the shade of the trees? By twirling my pencil in these colours I am able to spread all these beauties upon my canvas as you now see." And with these bombastic words, and a few additional touches of paint upon the canvas, the Giant Delusion conquered the people. It was curious to watch the effect of his doings upon them. He not only caught the beauties of nature and fastened them to his canvas, but those who came to see him were pretty well represented also by his wonderful hands. True, a shapeless daub here stood for a tree, and a fuzzy speck there made a goat, or may be a waterfall, just as it seemed to be required. A streak of black made hair, a white spot the face, a black spot the eye, and a red one the nose, and it was strange to see how he deluded people into believing that his productions looked like them. He was a sharp young fellow, and no mistake. The sweet young girl was tickled to see what beautiful curls he gave her, though she blushed to think that she never had them of her own. The gouty old King who had previously been chief ruler, was also willing to praise when the Gian artfully removed his wrinkles and pimples, and gave him nice fair skin, and assured him it was like him. Beautiful children, villians, quacks, impostors, the bald-headed, the homely, and the fair, were alike deluded, and none ran away, while poor Truth sat chained and speechless upon her tottering throne.

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* *Philadelphia Photographer.*

Thus the Giant Delusion reigned for ages. An occasional effort was made by some agent of Truth—such as the engraver on wood, steel, or copper—to divide the power; but so great was the hold that the other possessed, that these had to follow in his footsteps and copy after him, or forsake their vocation. It is so to this very day.

The Giant yearly grew more popular, and his fame became world-wide. Hundreds flocked to his assistance, and became his subordinates. Great buildings were erected to his service, and admirers grew in numbers. He did an immense business, and all his subordinates became very wealthy. The palace and the castle walls were adorned with his delusive daubs, and he joined hands with Imagination, to whom he paid a large income to assist him. True, his colourings were beautiful, but were they truthful? Nay?

Some of the most courageous became dissatisfied, and dared to express themselves so. They would enter the palaces, make telescopes of their hands, and look at the old, black, seam-cracked paintings, and declare them to be untruthful. The outlandish obeisance paid to Delusion must be stopped. Truth must be released from her imprisonment, and have a giant to fight for her! Who will do it? "I!" says a presumptuous Frenchman. "I will undertake to create the new giant, but it will be years before he can attain either very great strength, success, or much encouragement from the people, but he shall have all in due season."

"With what shall he defend himself?" cried the people "His weapons shall be certain mysterious chemicals, whose nature you must not know—a queer-looking little arrangement with a glass eye, and he shall have power to call the King of the day to his assistance whenever he desires it." "Have faith, and encourage him," cried the Frenchman, "and watch his growth."

And thus *Fidelity*, the giant opponent of Delusion, was created. Having placed his one-eyed box in position, by the motion of a black cloth, everything would creep into it, and be handed out to the people on a copper plate all polished and silvery. Trees, houses, animals, and people were all thus handed out to the astonished multitude without change of form or feature. He would even put his hands down into the bowels of the earth and bring up such wonders as few people imagined were there. And daily this youthful giant grew. Delusion would attack him wherever he could, and daub his work with ugly paint; and Fidelity would retaliate by splattering over the other's pictures a certain mysterious chemic he had, that was as clear as water in the bottle, but when thrown upon the paintings turned black as night.

Persecutions, threats, promises and compromises were all offered to the young giant by the other, but without hindering his growth or curtailing his usefulness. Venturesome persons were presumptuous enough to become his knights, and learn his black art, and practise it. Before many years he made pictures upon glass, iron, wood, paper, and oh! horrors, upon canvas! Great studios and beautiful stores were erected to the service of Fidelity, and old Delusion began to tremble. Finding his enemy becoming too powerful, he tried every way to destroy him. Some of his agents started journals, and wrote all sorts of things about Fidelity—calling him sham, humbug, short-lived, untruthful, deformed, distorted, and all sorts of evil names, until he had to start journals also to help fight his battles. Fierce struggles ensued, always ending in making Fidelity more popular, and adding thousands to his list of friends. So great was the demand for his work, that great factories and laboratories had to be erected to keep him in materials.

Some of the wiser friends of Delusion endeavoured to persuade him that his rival could be made of great assistance to him, but he scouted the idea. They tried to induce him to make friends, but he had held the sway too long, and his pride was too great to be conquered so easily. He secretly bought some of his opponent's productions and slyly used them to assist him. He even allowed certain of his subordinates to go out into the country with the knights of the other, but only to laugh at the results of their journeyings. Where are all the beautiful colours of these trees and flowers? he would ask. True, you have shape and light, and shade and perspective, but what are all these without colour? They are as faith without works, as works without charity; and to this day old Delusion hangs onto this query as his last chance for victory; but Fidelity, hard at work, calmly replies: "Give me time and I will yet supersede you even in that particular; with me all such things are possible."

And this is as far as we are able to tell the story of these two giants. Still they fight—still the battle rages. Who are they, and who shall win?

Correspondence.

FOREIGN SCIENCE.

[from our special correspondent.]

Paris, 24th October, 1866.

Some months have already elapsed since the *Moniteur de la Photographie* and several other Paris journals announced to photographers the appearance of a new kind of paper called "Leptographic paper." Messrs. Martinez and Laurent, of Madrid, were the importers of this useful novelty. Since then a company has been formed, workshops erected, a distinguished chemist charged with the direction of ths works, and the Leptographic Company now informs operators that it is ready to execute all orders that may be given.

I have now before me several proofs taken on this new paper, and can affirm that they are in every respect very remarkable.

The Company manufactures not only the ordinary leptographic paper, but also porcelain paper, and two kinds of cards, which save the trouble of pasting—the shining enamelled card, and the Bristol-board card.

All these different kinds are supplied ready sensitized, so that the photographer has not to use the positive silver bath, and thus avoids the inconveniences attending it, especially in large establishments.

The leptographic paper, if not exposed to light or damp, is warranted to retain its virtues for a long time. If yellow spots appear in the course of several months, it will only be on the back of the paper, not on the prepared surface.

The printing is done dry, as in the common process, and in one third of the time required for albumenized paper. However, over-printing is necessary, as the proof must be soaked in water for one or two minutes, after which it can be toned and fixed at once. In this case the bath is composed as follows :—

Water	... 900 grammes
Hyposulphite of soda ...	... 25 ,,
Chloride of potassium ...	... 30 ,,

After thoroughly dissolving the salts, stir the bath with a glass rod, at the same time introducing, drop by drop, a solution of 1 gramme of chloride of gold in 100 grammes of water. This will serve permanently, by strengthening it when it gets too weak.

This toning bath is the most convenient for operators, for, being rather slow, it acts gently on the proofs, which, in the second method, are easily covered with red spots. However, the second method appears to us preferable, for it economizes the gold, and gives tints which are generally better liked.

Second Method.

No. 2 is composed as follows : —

Common water... ...	... 900 grammes
Phosphate of soda ...	... 5 ,,
Chloride of sodium ...	... 3 ,,

After well dissolving the salts, stir the bath with a glass rod, while dropping in a solution of a ¼ gramme of chloride of gold in 100 grammes of water. This bath serves permanently; when it gets too weak, raise it to the proper strength by the addition of a sufficient quantity of the same ingredients. When new, it is very rapid; a few seconds suffice. If it be found too active, add a little water.

The tint obtained is a fine violet blue; but any shade may be procured, according to the length of the immersion, from a sepia red to a bluish black.

The proofs lose but little in the fixing bath.

Amateurs may obtain the toning bath (No. 1) at the offices of the Company, for 6 francs a bottle, and the phosphate bath (No. 2) at 3 francs a bottle.

The proofs, when taken out of No. 2 bath, are washed in ordinary water, and then put in the following fixing bath, where they must remain from 30 to 60 seconds.

The very short time for required fixing is owing to the fact that the coating of the sensitized surface is extremely thin.

The fixing bath is thus composed :—

Common water... ...	...2000 grammes
Hyposulphite of soda ...	... 100 ,,

As the proofs remain but a very short time in this bath, the washing required is merely immersing them three or four times in clean water. After three such washings, fresh water will not long show the least trace of the hyposulphite, as may be seen by testing it with a few drops of nitrate of silver.

With the orninary photographic paper, the cost of the carte de visite is only 4 or 4½ centimes (less than one halfpenny).

This paper has the aspect of the Wothlytype, and we believe that collodion is the base of its preparation. That it gives excellent results is indisputable.

M. E. Bowm has just published the description of a dry collodion process, which, he declares, offers great advantages. This collodion is composed of—

Ether	... 0·60 centimetres
Alcohol, at 40° ...	... 40 ,,
Nitrate of silver ...	... 1 gramme
Gun-cotton	... 1 ,,

He first dissolves the nitrate in a little distilled water, and then adds the ether and gun-cotton.

After being collodionized, the glass is plunged in the following iodine bath :—

Distilled water ...	... 100 centimetres
Iodide of pottassium	... 4 to 6 grammes
Bromide of potassium	... 1 gr. 50 c.

Then he washes and covers it with a varnish prepared as follows :—

Put six whites of eggs into a wide-mouthed bottle; next dissolve 50 grammes of dextrine and 6 grammes of glucose in 50 grammes of warm water. When the solution is complete, add :—

Iodide of potassium	... 1 gr. 50 centimes
Bromide of ditto ...	... 50 ,,
Iodide of ammonium	... 1 gr. 50 ,,
Bromide of ditto...	... 50 ,,

and a few particles of iodine. Mix the whole by well shaking. A few drops of ammonia are added when the albumen is well frothed.

In a separate vessel, macerate linseed in water for twenty-four hours. Then add water and one per cent. of iodide. One part of this mixture is added to two parts of albumen, shaken up, and left to settle for some days. It is then poured off.

This varnish is sensitized in its turn by means of a silver bath, at 8 per cent., with the addition of 8 or 10 per cent. of acetic acid. Wash the glasses, and they may be kept for any length of time without losing their virtues.

Ernest Lacan.

PHOTOGRAPHY IN GERMANY.

Transferring Negatives — Photographs of the War— Decorated Portraits.

Berlin, October 6th, 1866.

Some weeks ago, I made some experiments on the different modes of transferring collodion films, an operation very interesting for direct carbon printing, for photo-lithographs, and other purposes.

You know Mr. Swan's method for this purpose. He pours a solution of gelatine on the finished collodion film, and lets it dry spontaneously. Afterwards, it is very easy to remove the film wholly from the glass. This method is very good, but it has one evil,—the gelatine coating dries very slowly (requires from four to eight days sometimes), and the film is not permanent in damp air, but is very easily injured.

Therefore a method of removing collodion films from the glass quickly and easily, and on a condition which will not damage their permanency, will be interesting for photographers generally. Some months ago, my friends Grüne and Jacobsen proposed for transferring collodion films with the aid of a plain collodion containing three per cent. of castor oil, and four per cent. of cotton. M. Grüne named this collodion "leather collodion." This leather collodion is poured on the plate (varnished or not varnished), allowed to set as if for immersing in a silver bath, and the plate is then placed in common water. After some minutes the plate becomes milky, but changes its appearance in a short time, and again becomes transparent. The edges of the plate are next cut round with a knife, and the film removed under water.

This method is very good, but sometimes the leather collodion dissolves the collodion film with the image, and the latter is then ruined. I have lost some very good negatives in this manner, and therefore I tried a coating of the collodion film with an india-rubber solution before pouring off the leather collodion.

After some experiments, I found the following *modus operandi* to be the best if the plate is not varnished. Take an india-rubber solution, 1 part india-rubber, 50 to 100 parts benzine, pour it on the collodion film, and allow it to dry perfectly; afterwards pour on the leather collodion, and treat it as above mentioned. If the plate is varnished, pour on it alcohol, 90 per cent., for dissolving the varnish, let it run off and dry, then pour on the plate benzole and india-rubber, and treat it in the same manner; let it dry, and afterwards coat it with the leather collodion, and put in water. The transferred films are very solid and a little elastic. I have in this manner transferred old films produced a year previous.

Some months ago your contributor, "The Old Photographer," expressed the opinion that photography would play an important part in the last German war, for giving true sketches of the most important points of the theatre of war. But that has not been so. Many photographers had indeed the intention of following the army; most of them, however, could not proceed further than to the limits of the kingdom, our army ever advancing with such a rapidity that it was almost impossible for a private photographer to follow it. Add to this the want of the most necessary agent, since on the theatre of war in Bohemia there was not even water for drinking, not to say for making photographs.

But a far more striking consideration than all those above-mentioned is the utter defencelessness of photographic productions from piracy, at enormous expenses, Mr. H. Graf, two years ago, made an album of the war in Sleswig Holstein. The first prints of this scarcely having been published, they were copied, and the author deprived of the profit of his costly work.

A photographer, Mr. Steihm, has visited the theatre of the war during the last month, and made a series of very interesting prints, but he will not publish them, and intends to sell them by way of subscription. Therefore, till now, not a single photograph of the war has been published, and consequently, we have no better pictorial mementos of this glorious campaign than awful pictures, coloured with indigo and vermilion.

Recent events have induced some photographers to re-introduce a series of old photographs, provided with a new, peculiar marginal decoration. Thus we find busts of our King and of the generals environed by a photographed garland of laurel. The first images of this kind were made extremely rudely. A natural crown of laurel with white background was taken and copied, and into the finished copy the separately copied bust was then mounted. Now this is made in a more simple manner:—First, the bust is copied with vignetted margin, so that the latter remains white, and then the same paper, together with the negative of the garland, is exposed to light, and the latter copied on it.

If the persons may be arranged (which is not always possible), it is very easy to make portrait and decoration on the same plate. Either the person is placed behind a frame enclosing the decoration; or first, the bust of the person is taken alone by placing a suitable stop before the plate, and then, on the same plate, the decoration (garland or otherwise) posed before a background of black velvet. The stop before the plate is removed previously, lest portrait and decoration be developed at once. Precaution is necessary in order to avoid fogging in the middle of the plate (with the portrait).

A third manner of making such decoration is the following one:—Take a filigree pattern of thin black paper, like the well-known fine paper-screens for lamps, carve it suitably, and put it, during copying, between paper and negative.

By these different ways a long series of nice decorations may be procured, which might be suitable for not only old generals, but even for pretty young girls.—Yours very truly,

Dr. H. Vogel.

THE ACTION OF CYANIDES UPON GOLD AND SILVER.

Dear Sir,—A month ago you were kind enough to insert a letter from me, containing some remarks upon statements lately made in an American paper by Mr. Carey Lea. Since that time the author appears to have been continuing his experiments, and arrived at a further confirmation of my previous results. Particularly he notices the fact that cyanide of potassium effects the removal of the silver from the whites of albumenized prints—an observation pointed out by myself four years ago—but he encounters a difficulty, where none need be felt, in proceeding to explain the reduction of vigour observed in the case of prints treated in this manner. The solvent action exerted by cyanide of potassium upon the finely-divided silver and gold in the picture is in harmony with the known affinities of the elements taking part in the chemical reaction, and might be expected to make itself apparent sooner than in the case of these metals, being subjected to the influence of the cyanide in their compact or reguline condition.

To account for the solvent action is not difficult. Whenever a plate of silver (or gold) is left immersed in an aqueous solution of cyanide of potassium freely exposed to the air, a solvent action is exerted; and the metal plate is quickly attacked, and often cut through at the water-line, as the result of the corrosion occurring more particularly at this part. Collodion negatives may have their intensity very considerably lowered, or the silver may be dissolved altogether, by the prolonged action of a cyanide fixing bath. Prof. Faraday showed us, ten years ago, at the Royal Institution, how quickly gold-leaf was attacked by aqueous cyanide of potassium, and exhibited on the screen the alteration of colour, by transmitted light, consequent upon the diminished thickness of the metal.

Such are the facts: now for explanation. The cyanides of gold and silver are insoluble in water, but are capable of uniting with the alkaline cyanides to form double compounds which are freely soluble. The metallic salts thus formed are more stable in their nature than the simple cyanides, which latter are known to be decomposed even by the carbonic acid in the air. On the other hand, the caustic and carbonated alkalies are incapabable of breaking up the double cyanides in question; their solutions may be mixed together without the formation of oxide, or any other change being observed.

So great is the affinity of cyanide of potassium for other metallic cyanides, that even silver and gold are forced into such union by being first supplied with the necessary cyanogen at the expense of a portion (even to the amount of one-half) of that contained in the alkaline cyanide. As a necessary consequence of the removal of cyanogen, an equivalent quantity of potassium, or other alkali-metal, undergoes oxidation, and appears as a secondary product in the aqueous solution. The chemical changes may be represented by the following equations:—

$$\text{I.}\quad \mathrm{Ag} + 2\,\mathrm{KCy} + \mathrm{O} = \mathrm{Ag\,Cy,\,KCy} + \mathrm{KO}.$$

$$\text{II.}\quad \mathrm{Au} + 2\,\mathrm{KCy} + \mathrm{O} = \mathrm{Au\,Cy,\,KCy} + \mathrm{KO}.$$

The simplicity of this reaction is not so easily apparent when the new atomic weights ($O = 16$, &c.) are adopted, for in that case the whole formula, excepting the oxygen, will require to be doubled. Lastly, it is manifest that by the absorption of carbonic acid from the air, all or part of the caustic alkali may become converted into carbonate of potash.—I am, Sir, yours, &c., John Spiller.

Woolwich, October 22nd.

TWOPENNY PIRACIES.

Sir,—I beg to take the liberty of writing to you, hoping that you will give the following lines space in your valuable paper. A friend of mine, a soldier, sent to Mr. ——, General Photographic Offices, Victoria Villa, Portland Road, Notting Hill, London, 2s. 8d. for 16 cartes-de-visite (which Mr. —— advertises to print for that sum) and received a receipt for the same, dated 13th February, 1866, saying that the cartes-de-visite would be returned in ten to eighteen days (weather permitting), or shortly afterwards. My friend left England for Japan soon afterwards, leaving with me the receipt to get them. I have written to Mr. —— times out of number, requesting him to forward them to me, and only got an answer to my first letter, saying, "Your cartes will be sent when ready." That letter is dated 31st March, 1866. Having written several times since, and received no answers of any kind whatever, and having never received the cartes-de-visites yet, I think I am only doing my duty to the public to warn them against such a practice. I think that Mr. —— never intends to send me my friend's cartes-de-visite, or he would never treat my letters with the contempt he has done, by not answering them. If I had not resided such a great distance from London, I would have taken legal proceedings against him before now.—I am, Sir, your obedient servant. James M. Faed.

3, Eldon Street, Back, Newcastle-on-Tyne, October 17th, 1886.

[We always regret that loss or annoyance should be suffered by the public in any connection with photography; but it must be apparent to anyone, on a moment's reflection, that such transactions as these are not legitimate trading. It is impossible to produce good photographs at twopence a-piece; and if it were otherwise, it is a wrong to the original photographer who took the negative, not only to deprive him of the opportunity of printing whatever copies are required, if the portrait be satisfactory, but to degrade his work by circulating vile copies of it. We hope the public will avoid sanctioning such a petty form of piracy, and be warned by cases like that recorded.—Ed.]

FADING CAUSED BY THE MOUNTING CARDS.

Sir,—A short time since I was much troubled by my prints, after being mounted, turning streaky, and gradually fading away and becoming very yellow. Finding the carte-de-visite only went in this way, that other prints, stereoscopic and larger sizes, printed at the same time, and in every respect treated the same, "except being mounted on other cards"—remained all right, I came to the conclusion it must be in the cards, and find it was so. I believe them to contain a large quantity of hyposulphite of soda, which, I understand, is extensively used during some stage of the preparation of the card. If any of your correspondents meet with a like trouble, let them look to this new and serious evil, and well test their cards. Mine were from an old-established and highly respectable firm in the City. I have just communicated to them about it, and have not yet received an answer. Enclosed I send you a few prints for your inspection. I have a large quantity by me, all gone in the same way.—Yours truly, Hypo.

Walford, October 8th, 1866.

[The presence of hypo in the mounting cards as a frequent cause of fading was pointed out by Mr. Maxwell Lyte some years ago. We fear it is a frequent and unsuspected cause of this evil. In the cards sent to us by our correspondent, a very skilful professional photographer, the fading is very manifestly due to mounting, the yellow streaks showing the markings of the paste-brush, where excess of moisture has caused the chief action of the hypo in the card. On testing the back of the card, by touching it with a solution of nitrate of silver, a brown stain was the immediate result, showing the presence of hyposulphite of soda in large quantity. The evil is a serious one, and it is difficult to suggest a certain remedy. In the case in question, the presence of the deleterious substance was readily detected by contact with nitrate of silver; but where it is present of smaller proportion, it may be necessary to soak a card for some time in warm water, and then test the water by adding a few drops of nitrate of silver solution, which, with hypo, will cause a brown turbidity.—Ed.]

Talk in the Studio.

Photograph of the late Eclipse.—We have received from Mr. William Brooke, a photograph which possesses a peculiar interest, as consisting of a landscape with the Druidical remains, Mulfra Quoit or Cromlech, near Penzance, in the foreground, and a view of the partially obscured setting sun as seen during the late eclipse. Photographs of various eclipses have been taken, but none that we know of including a landscape as well. Mr. Brooke says:—"You will notice the side the sun is obscured; the apparent dark circle round the sun is broken, and the shape of the sun is quite perfect and distinct. I had been out all the day photographing a few of the antiquities, and when I arrived at Mulfra it was getting rather late, owing to breaking the spring of the carriage. I was in company with Colonel Coke, who was as much surprized as I was. It was very dull at the time I was about to expose the plate, and I was obliged to give a long exposure of about three minutes, wet plate, and suddenly the sun shone out very bright at about half the exposure, and of course I supposed the plate would be fogged, and I did my best to save it. I knew that I could not attempt another plate, and the result I send you. You will see that the plate is nearly free from flare, with the lens direct to the sun."

Robbery of Lenses.—We bring under the notice of our readers an announcement in our advertising columns in which Mr. Dallmeyer calls attention to an extensive system of robbery which has been, for some time past, going on in his establishment. It appears that a young man named Coates, engaged for several years by Mr. Dallmeyer as messenger, has been robbing him for some time past. Various stolen lenses are already traced, and it may be well for photographers and dealers to be on their guard against purchasing second-hand lenses, the ownership of which cannot be properly substantiated. More disastrous still, in some respects, has been a pettier form of robbery. The same youth has systematically kept back the cash entrusted to him for the postage of foreign letters, and hid the letters. A pile of some scores of such letters, invoices, receipts, and communications of various kinds, which should have been posted to correspondents during the last few months, was recently found hid away in a cellar. The exact extent of the robbery, and of the evil inflicted by delaying the letters, cannot be easily estimated. The culprit, and an accessory named Knight, have been charged at Bow Street, and committed for trial.

Photographic Piracy in Dublin.—We find in the *Freeman's Journal* a long report of some cases of piracy heard before Police Magistrate Mr. O'Donel, and remanded two or three times. Mr. Lesage had taken and duly registered a photograph of Cardinal Cullen, of which pirated copies were speedily issued at half the price. Three persons were summoned for the piracy, Mr. O'Reilly, carver and gilder, Mr. Lee, manager of Messrs. Richardson's bookselling establishment, and Mr. Moroney, stated to be the producer of the pirated copies. After hearing the evidence, Mr. O'Donel remarked that the progress of art would be utterly discouraged if piracy were not prevented; but he would take a lenient view of the matter, and fine each defendant £1 and costs. The negative and all prints to be given up.

Photographs of the Absent.—The *Athenæum* says:—"The Mormon photographers must be in advance of others; at least, photographic artists among the Mormons undertake to "fill promptly all orders by mail."

Bankruptcy of a Photographic Pirate.—A curious case came for hearing recently in the Court of Bankruptcy. The debtor, William Johnson, a dealer in photographs, is the person against whom Mr. Henry Graves, of Pall Mall, print-seller and publisher, recently instituted proceedings for vending certain pirated copies of engravings of some of Sir E. Landseer's celebrated pictures. He was convicted of the offence, and the magistrate inflicted upon him penalties amounting altogether to £80, which he was unable to pay, and he was committed to prison for his default. It was now contended that, as the penalties could be discharged by payment, they constituted such a debt as could be proved under an adjudication in bankruptcy. The debtor had been advised to file a deed under the Bankruptcy Act of 1861, and thereupon obtained protection of his person and property on the 8th September last. Notwithstanding such protection, the complainant, in the proceedings under the Copyright Act, on the 12th of the present month, obtained a magistrate's order for the debtor's committal for non-payment of the penalties, and he was accordingly arrested shortly afterwards. An application was now made for his release from prison, upon the ground that the arrest was made in defiance of the protection of the Court of Bankruptcy. His Honour said he felt that he had no jurisdiction under sect. 112 of the Act of 1849, nor under sect. 197 of the Act of 1861, but he would say on a future day whether this was a case in which the Court ought to enforce obedience of its own protection under sect. 198 of the latter statute. Subsequently judgment was given. The Commissioner held that the debtor had a right to his freedom.

Blue Frosting for Sky-Lights.—Mr. Leighton Pine writing to *Humphrey's Journal* says:—Thinking, perhaps, that some of your readers may wish to soften the effects of their sky-lights, or stop reflections from certain portions of the same, we send you herewith a recipe for making a blue frosting, which answers the purpose most admirably. It softens the light, excludes none of the actinic rays, and improves very materially the chemical effects, by shutting out all but the useful light. The two articles of which the frosting is composed, can be purchased at any paint store, and are—Linseed oil (boiled), ultramarine blue (dry). Mix these two articles, and add the blue until the required depth of colour is obtained, and the frosting is ready for use; but if allowed to stand some time before applying, it must be mixed again, as the colour settles to the bottom. It must be stippled or patted (not painted) on the glass, with a good size brush, and if one coat does not answer the purpose, repeat the operation until the effect is satisfactory. We have used this frosting in every place where it was necessary to use blue glass, and have had no cause to complain of its working, besides saving considerably, as blue glass is quite expensive. It is a difficult matter to always get blue glass of the right shade, but by using this frosting on plain glass, any desired shade can be obtained, and, as the frosting dries quickly and cannot be removed except by boiling in lye water, glass prepared in this manner will be found quite as durable as the regular blue glass.

L'Etoile Belge, a Brussels newspaper, after announcing the terms of subscription, publishes the following attractive notice:—"All persons whose subscriptions amount to the sum of ten francs may present themselves any day at the studio of Miss —— to have their portraits taken gratuitously."

Head-Rest Fifteen Years Ago.—A correspondent says: "I see a good many head-rests advertised. Perhaps the following description may be interesting to some of your readers; it is quoted from the *Magazine of Science*, Vol. 1, page 272, date 1841. "Amongst the numerous improvements proposed in the Daguerreotype, is the following by M. Jobard, of Brussels, for taking portraits à Helcographé. Paint in dead white the face of the patient, powder his hair, and fix the back of his head between two or three planks solidly attached to the back of an arm-chair, and wind up with screws. The colour of the flesh not reflecting sufficiently the rays of light, would require a powerful sun, whereas a whitened face will be produced as well as plaster figures by different light."

To Correspondents.

*** Agents and Subscribers are informed that the numbers of the present volume which have been out of print are now reprinted, and complete sets can be obtained.

Constant Reader.—As Mr. Fry has more than once, during the last twelve months, stated the formula he used, you should, as a constant reader, have seen it. The chief point upon which he depends for obtaining vigorous negatives, without intensifying, consists in the use of the organic iron developer. Many recipes have been given in our pages for preparing this, and it frequently happens that different studios, with different kinds of light, require modifications in the developer which each operator must make for himself. A very simple form of the organic developer consists in adding from one to two grains of gelatine and ten minims of acetic acid to each ounce of a 20-grain solution of protosulphate of iron.

T. Ward.—The varnish has been received, and shall be duly tried.

A. Bawmos.—The mottled, uneven darkening of the piece of developed print you enclose is due to unequal penetration of the solutions. It is probable that the salting solution had penetrated the paper unevenly, and hence the unequal formation of chloride of silver.

Cygnus.—If you attempt to prepare your own tissue, your pigmented gelatine must be filtered through flannel. 2. The colour of Indian ink alone is not satisfactory, for this reason: there always remains in the blacks of the print a trace of green oxide of chromium, which, added to the Indian ink, gives an unpleasant green black; hence the necessity of adding some red tint to overcome this greenness. 3. When Mr. Swan sends out his tissue for commercial use, it will, we believe, be prepared in different tints, and of various intensities to suit different negatives. 4. The after use of an oxidizing agent will not permit you, with impunity, to use the old hypo and gold bath, because there is always danger, when using it, of producing sulphide of silver in the print, and there is no certainty that the oxidizing agent will convert sulphide formed in the print into sulphate. Oxydizing agents would be useless after using sulpho-cyanides.

M. Cage.—A neutral toning bath of any kind, if long kept, especially if kept in the light, is apt to precipitate its gold. The precipitate is generally purple however, and not yellow like gold dust. The best mode of dealing with such a precipitate, is to make it slightly acid, with nitric acid, and then add chloride of lime and boil the solution. By this process the gold will be re-dissolved, and the solution will only require neutralizing with chalk to be ready for use again. For details, see last Year-Book, page 33. Thanks for the paragraph.

S. H. (Leicester). Your difficulties arise chiefly from two causes: your lens is not suitable for the work, and you have too little light in your studio. The lens, unless your manipulation be very faulty, does not appear to be a good one, and in any case the focus is too short for standing card pictures. Get a better lens of longer focus, and extend your side and top light to not less than eight feet, or ten feet if you can. Your present lens might do better if you used a small stop, but that would still more reduce your light. Your side-light would be better if it extended to the ground. The extra light must be obtained, of course, at the camera end of the room.

R. T. W. (Wedmore).—Unless you are familiar with Calotype manipulations, you will not be likely to succeed better with it for producing enlarged negatives than with the collodion process. You will find the details on p. 37 of our last Year-Book. You will not be able to procure paper ready prepared.

P. A. E.—We are not informed of the movements of the "Amateur Photographic Association." You will doubtless obtain information on the points you mention of the Secretary.

A. Stewart.—If 6 7-8th inch be the back focus of your lens, it may, if it be a good lens, probably answer for cabinet portraiture. 2. On adding acetate of soda to the organic developer, made after Mr. Carey Lea's formula, sulphuric acid is neutralized by the soda, but acetic acid is set free, so that you would not find the solution neutral. You will probably find that Mr. Cherrill's formula, in which the glycocine is made separately and added to the iron solution, will answer your purpose best, and give you least trouble.

C. R. Lobb.—The result of experience, since the tunnel form of glass has been tested, is decidedly in favour of the ridge-roof, with or without a dark portion for the camera. Should you, however, retain your present form, the side-light should be taken up to the top, and so join the top-light. You will find that a very great improvement; and it is not important or even desirable to extend the top-light any further. We should not alter the level of the floor in any part.

Scubiton.—Sulpho-cyanide of mercury is made by adding to a saturated solution of sulpho-cyanide of potassium or of sulpho-cyanide of ammonium, solution of per-nitrate of mercury as long as any precipitate is formed. The precipitate is carefully obtained from the solution by filtration, and then washed several times. The substance is very dangerous to work with.

A New Subscriber.—We have had no experience in making Pharoah's serpents, and cannot tell you how they are made of different colours. See answer above.

Wm. Sturgeon.—The want of relief in stereoscopic pictures may easily proceed from other causes than errors in mounting. If the subject includes no near foreground objects, and it were taken with binocular camera, very little effect of relief would be produced. If you can cut the two pictures exactly alike, and transpose them properly, mounting them 2¼ inches from the centre of one to the centre of the other, they ought to combine at once, and give a fair amount of relief. You will find some details on the subject at p. 271, Vol. V. of the Photographic News.

J. Barratt.—It is scarcely to be anticipated that the cabinet portraits will have such a demand as the card portraits have had; the latter will doubtless always retain a position, and those who prefer them for cheapness, portability, &c., can still have them. But this fact in no wise militates against the probability of the cabinet portrait becoming popular, if photographers are unanimous in endeavouring to make them so. We should regard it as very unwise indeed, now that they are introduced in this country, in Germany, and in America, and albums made for them in each country, to suggest for one moment any alteration in the size. Any such step would be most disastrous, and we should strongly counsel photographers not to think of such a thing. There may be trivial alterations in the width of the print itself, as there are in cards, but the size of the mount should be strictly adhered to. We have just received a letter from Mr. Notman, of Canada, saying that although he had had albums made, and apparatus arranged for a slightly smaller size, which he likes better, he is willing to abandon it, and work the cabinet size, for the sake of uniformity, and the influence it will have on the public.

J. C.—We find that if albumenized prints are treated with Newman's "sizing preparation," they at once take water colours without difficulty. After that, any good water colour may be used to produce a good effect. You will find a little work entitled "Harmonious Colouring Applied to Photographs," very useful to you.

T. J. Reeves.—Thanks. The communication in our next.

Amateur.—The matter shall receive our attention.

Wm, Baker and other Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 426.—*November* 2, 1866.

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STREAKS ON THE NEGATIVE, CYANIDE IN THE BATH, ETC.

As a general rule, when fog, streaks, or spots appear on the negative, although various remedies may fail, there is a final resource which ends all difficulties: this is to commence *de novo* with new materials, either collodion, or nitrate bath, or both. Sometimes, however, it happens that this does not put an end to the perplexities of the photographer; even with new materials the old trouble remains. In such cases the difficulty is serious, and at times remains beyond fathom, the defect finally disappearing from causes unknown. We have recently heard of several of these difficulties which elude careful investigation, and which are probably due to a complication of causes.

The difficulty which has recently been rife consists of streaks in the direction of the dip: in most cases they are transparent lines, not perfectly straight, commencing near the end first immersed in the nitrate bath, the part of the plate at which they commence often being covered with mottled, irregular markings, less opaque than the rest of the film. The general appearance of the plate often resembles that produced by using collodion which is over-iodized, with the difference that the marks are less opaque, rather than more opaque, than the rest of the film. Sometimes streaks are accompanied by irregular-shaped spots, approximating in size to that of the capital O of the type in which these observations are printed. The markings are generally apparent on the film the moment it is removed from the nitrate bath, but are still more prominent in the finished negative. They differ from another form of lines in the direction of the dip which often accompanies a slightly foggy condition of the bath, and in which the lines are straighter and generally a little more opaque, instead of a little more transparent, than the rest; but it is not improbable that this may proceed from analogous causes, or be removed by similar remedies.

One skilful photographer with whom we recently conversed, being troubled with these lines, brought his glass bath into the light, and watched the coating of iodide of silver in course of formation. He found that immediately the plate was immersed in the nitrate solution, its surface was coated with iodide of silver, the action being exceedingly rapid; and from some cause, unexplained, a repelling action was exercised by the part of the film which formed the lines, the formation of the iodide of silver being less rapid, the lines being distinctly observable in the bath. Without being able to assign a cause to all he observed, it struck him that the formation of the sensitive coating was too rapid, and that if it were more gradual the repulsion exercised by the film where the lines were formed might not be exercised; or, if present, the result might be less apparent when the plate generally was excited more slowly. It occurred to him, therefore, to reduce the amount of bromide and iodide present, and so reduce the rapidity of the change in the nitrate bath. The collodion was accordingly diluted, by degrees, with plain collodion, making trial between each addition. When about one ounce of plain collodion was added to five of the iodized collodion the defect disappeared.

Although the dilution of the collodion proved a remedy, it does not necessarily follow that over-iodising was the cause of the evil. Nearly two years ago, Mr. Sebastian Davis read a paper in which he stated a systematic series of experiments with the collodion, and each of the materials employed in making it, and with the nitrate bath, changing each in turn, but securing the same markings with all. The only remedy which removed them, in his case, was the removal of the plate from the nitrate bath the moment after its immersion, and keeping it moving until it was excited, instead of allowing it to remain about thirty seconds before moving, as is customary. This method prevented the formation of the streaks. We remember that at that time Mr. J. R. Johnson suggested that the probable cause of the streaks was small streams of ether vapour running up the film, which repelled the nitrate bath for a time, thus causing a thinner deposit of iodide of silver than elsewhere, where no such repelling action had taken place. This explanation seemed very feasible, the more so when it is remembered that these streaks are most prevalent in autumn, just when the cold weather is setting in. A collodion film which had set sufficiently, and got rid of its ether in a few seconds in summer, if immersed in the nitrate bath after the lapse of a similar interval when the air was colder, would probably have a considerable amount of ether still escaping from it, and might easily, if immersed in the bath in this condition, cause the repulsion in question, and the streaks as its consequence. This theory was the more probable from the fact that different samples of collodion and different nitrate baths gave the same result. The remedy of Mr. Sebastian Davis would be quite consistent with it, as would also the diluting of the collodion, which made the process of sensitizing so slow that the repellent action of the ether had passed off before the bromo-iodide of silver was formed in the film. Certain it is that at the close of each summer, just as colder weather is commencing, the trouble of streaky plates is most rife; and many photographers whom we know get rid of them by keeping the coated plate a little longer before immersion, so as to allow the film to set very fully.

Unfortunately, the remedies just indicated, so simple, are not always efficient. We have also, within the last few days, witnessed, in a large establishment doing first-rate work, another case of streaks, in which these remedies failed to effect a cure. The streaks in question had been very troublesome during the last few weeks, their appearance and that of a lower temperature being coincident. Different samples of collodion and different baths continued, in greater or less degree, to give the streaky plates we have before described. The remedy of adding plain collodion was tried, but with a very slight mitigation of the evil; whilst, on the other hand, the negative was otherwise worse for this dilution of the collodion, giving a poorer image, and a greater tendency to spots, pinholes, &c. We watched, with considerable interest, the effect of raising the temperature of the dark room, and allowing the plates to set more perfectly before immersion; and this certainly effected a decided improvement, but did not entirely remove the defect; and a more careful examination of the nitrate baths—three different sixty-ounce baths were tried—suggested that they were all, probably, more or less, out of order. Before treating them, or making a new bath, a new sample of collodion by a different maker was tried, in the newest of the baths, one which had been recently made and comparatively little used. The new sample of collodion was very fully iodized, and received a creamy coating within a second or two of its immersion in the bath. On moving the plate up and down, irregular flakes of the creamy coating were washed off, as if the film had been abraded against a stiff-haired brush. On examining closely, we found that the collodion film remained intact, but the coating of bromo-iodide of silver might be rubbed off quite clean, without disturbing the collodion. We at once suggested that the bath was much too weak; but were assured that it was a recently-made thirty-grain bath. On testing with the argentometer, it was found to register only ten grains per ounce. It was now treated with cyanide, and after filtration, a plate was coated and immersed, and, so far as we could judge by the dull light—day rapidly declining—it was clean and free from streaks and markings of any kind. It was now strengthened, and a few drops of nitric acid added for trial next day, when it would probably work satisfactorily: the actual result we have not yet heard.

We have referred to the cyanide remedy, and we have another interesting illustration of its value to detail. This somewhat empirical remedy, the use of which was first suggested in our pages not less than five years ago, was first laughed at, and next pretty generally adopted. As it is now receiving recognition as a remedy of real value, we once more repeat the name of the gentleman to whom the public are indebted for the suggestion—Mr. James Tulley, of Sheffield. We notice that it has recently received strong commendation, in a contemporary, from a correspondent, who is, we are glad to remark, well read in his Photographic News, as he adopts our own remarks in our own language,* on the action of cyanide, omitting, however, the usual formality of acknowledgment.

Within the last few days, an eminent photographer communicated to us his experience with cyanide in the nitrate, which he has never found to fail, having tried it at intervals ever since he saw it in our pages. A bath, which was in the worst possible condition, giving streaks, stains, and spots, was treated with cyanide, and set aside. A few days ago it was tried, and found to fog slightly, and give faint streaks, yielding, however, in other respects, a good negative. To a pint of the solution, three drops of strong nitric acid were added, and a negative tried. The result was much better, but a slight trace of fog was still present, which would easily rub off on touching. Three more drops of nitric acid were added, and a plate tried, with still better results. The same operation was repeated, trying a plate each time, until twelve drops of strong nitric acid were added to the pint of nitrate solution, each addition giving an improved image. But this was not all: with each addition of nitric acid, a marked increase in sensitiveness was obtained as well as of excellence. We have seen the negatives in question, each plate showing a marked improvement in brilliancy, roundness, and bloom, the last being an exceedingly perfect picture, obtained during one of the dull days which have prevailed this week, in seven seconds, with a No. 2 B lens and No. 2 stop. The whole story would have been regarded, a few years ago, as an incredible paradox, that cyanide of potassium should be added to a silver bath to get rid of stains and spots, and that nitric acid, subsequently added, should be the especial source of rapidity as well as of brilliancy.

THE COLLODIO-CHLORIDE PROCESS.

The *Photographisches Archiv* notifies the receipt of a fine stereoscopic print produced by the collodio-chloride method, and publishes the following communication from M. Lucke, of Grabow, with reference to the employment of that process. He says: "I have succeeded remarkably well with the collodio-chloride process, and I find it particularly well adapted to the copying of vignette pictures. I float my paper, which I receive in a perfectly unprepared state, on a solution of gelatine containing five per cent. of that material; and to prevent its drawing together, when coated with collodion, I mix with the latter a proportion of glycerine. By adopting this modification my paper always remains quite flat, and the toning and fixing operations are much more readily performed.

Very beautiful effects may be obtained with this process by using the *Papier Pellec*, which may be had of any desired tint or colour. This paper is more especially applicable to landscape pictures which contain white surfaces of considerable size.

NOTE ON COLOURED SHADOWS.

BY DR. T. L. PHIPSON, F.C.S.,

Member of the Chemical Society of Paris, etc.

The interesting paper by Professor Nicklès, Member of the Chemical Society of Paris, which has recently appeared in the Photographic News, reminds me of an experiment which I have not yet seen mentioned in any of our works on physics. M. Nicklès brings forward a number of curious facts, which show the influence of *lighting* upon the colour of bodies. It has been demonstrated that the artist who works at night in his studio, or the chemist who prolongs his researches after dusk in the laboratory, is apt to experience great inconvenience, caused by the different colours presented by bodies when viewed in different kinds of light.

But it has also been observed that the nature of the light in which an object is seen not only affects the object itself, but also its shadow. Some of our readers may probably be already acquainted with the following simple experiment:—A cylinder of wood, a cork, or other opaque object, is placed upon a table near a window, and preferably upon a sheet of pure white paper; near to it is placed a candle, so arranged that the shadow produced by the latter, and that produced by the daylight from the window, fall near each other. It will be observed that the shadow thrown by the daylight is *blue*, whilst that produced by the candle-light is *red* or reddish brown, according to the nature of the combustible with which the candle is made. At the spot where the two shadows overlap, the shade is *black*, unless the intensity of one of the sources of light is much greater than that of the other.

Now I find that if, in place of the candle, we made use of a lamp, in which various substances may be volatised, or in which we can burn different combustibles, the nature of the shadow thrown by each distinct substance will be slightly different from that produced by the others, and in certain cases the difference is so great as to enable us to distinguish readily, by this means, one substance from another.

Laboratory of Analytical Chemistry,
4, The Cedars, Putney, S.W.

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* In an article on p. 73 of our last Volume we made some explanations as to the action of cyanide in the bath, portions of which, *verbatim et literatim*, are adopted by the correspondent in question.

A PRACTICAL PHOTOGRAPHER'S CONFESSION.

A gentleman whom the Editor of the *American Journal of Photography* describes as a well-known and eminently successful photographer, having been requested to publish the details of the modes of operating whereby he has achieved such success, states that, like Canning's Needy Knife-grinder "story, he has none to tell." The more he has thought over his operations, the less he has felt they were worth recording. We suspect that many of the best operators in all countries feel strongly impressed with this idea. All that they do well seems to them so much a matter of course that they do not think it worth repeating. Many men do not know in what their real strength lies. We remember, some years ago, making application to a photographer, pre-eminent in art-culture and ability, to write a series of articles on art in connection with photography. In perfect good faith he replied that he thought he could impart a few valuable dodges in manipulation. It is, however, to be regretted at times that able men are disinclined, not from secretiveness, but from modesty, to restate their modes of operation, which, however commonplace to themselves, often contain valuable suggestions to others. The American correspondent in question is evidently a practical man, and makes his confession with *naïve* modesty. He says:—

I found that I had invented nothing, and that there is not a single step in the photographic routine which I follow for which I am not indebted to others. If I can claim any merit for myself, it is only that of judiciously selecting from that which is set before me.

I have very little of the speculative turn by nature, and I have not made good enough use of my slender opportunities of education to be able to understand the science of photography. Knowing these to be beyond my capacities, I never harbour any theories about the nature or action of light. If I am obliged to say anything about the theories of photography, it is simply that I neither know nor care about such things. When I adopted photography as my avocation, I chose it from among other pursuits as the serious business of my life. Photography was the rock upon which I built all my hopes. My personal welfare, and those things which I saw for the future, a happy household with noble children, were irrevocably dependent upon photography. Feeling thus in the beginning, and remaining steadfastly of such a faith, the success I have had has come by degrees; and surely no one will begrudge my success! May I not say that I have earned it, and that I deserve it? By reading, by studying, by proving things, and by holding fast to that which is good, I feel that I have paid the full but fair price of what I have acquired. I have accomplished nothing which is not within the reach of others.

Now I have embraced this opportunity of appearing in public to impress upon photographers the fact that their vocation is worthy of their highest ambition, and that, like any other legitimate business in life, ours is not the result of chance. I believe sincerely that photography is a noble art, and that it should be classed with the highest employments of men; but it has no honours for those who do not seek them with patience, and zeal, and love.

My friends seem to think that I have some valuable recipes. I was once offered a hundred dollars for my collodion formula. If this man followed my advice, he is a subscriber to the Journal, and he uses his money to better purpose than buying processes. When will people satisfy themselves that there is no royal road to knowledge, and that money cannot purchase skill and common sense?

Do not understand that I find recipes and formulas of no value, or even of little value. I am, in fact, interested in everything of that kind which has any novelty, and I use a great part of my leisure in testing them. I confess to a great deal of curiosity about my neighbour's work. What I deprecate is the exaggerated reliance on formulas to the neglect of other things more essential. A complete process, according to my view, is no more than the marble to the sculptor, or the palette to the painter. What would be thought of the aspirant to the honour of the academy, who should spend his time in the compoundings of colour?

I see there is always room for new formulas, and I value my Journal chiefly for them, yet I verily believe that many photographers make a wrong use of them.

ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

Inventors and Inventions—Carbon Prints—Cabinet Portraits—The Relief Fund—The Athenæum and Photography.

October being the month of photographic calm which precedes the storms and tempests of the coming sessions, photographers are glad to lay hold of any stray straws of photographic gossip to keep their heads above water during the dull season. Fortunately, we have been unusually well supplied with a subject for talk, considering the time of year, in the method Mr. Claudet proposes for distributing the focus over the various planes of a subject represented in a photograph, and which method some of those who are always in the opposition, whatever is suggested, be it good or bad, must think of more importance than they care to own, if we may judge from the virulent way they have done their best, or worst, to deprive that gentleman of the honours which are fairly due to him for his suggestion, and still more for the way he has forced it upon the attention of photographers. It has been said that the idea is old; that half-a-dozen people have suggested the same thing; that interfering with the absolute optical focus was unorthodox and heretical; and finally, that if it were new, and of any use, it didn't matter, which argument is quite unanswerable.

On the subject of inventions and inventors I have, perhaps, peculiar notions, but I feel them strongly, and have no objection to announce them openly. I hold that honour is principally due to the man who first thoroughly works out and brings before the world anything useful or new, and that he who, imagining a good thing, contents himself with publishing his idea, and lets it drop, is deserving of blame, and only fit to people foundling hospitals for the reception of unacknowledged notions. To let it drop argues that you do not see the importance of your invention; and according to these views of mine I should give the honours of bringing out the collodion process, upon which we all more or less exist, to Dr. Diamond, who worked it out, rather than to Le Gray or Bingham, who first suggested the use of collodion, or to Archer, who first practically applied it to photography. Here is another illustration. To whom do the honours of the collodio-albumen process belong?—to M Taupenot, who first suggested the rough outline of it, or to Mr. Mudd, who has worked it up to such an astonishing state of perfection, that all other dry processes are things that had better never have been suggested to lead photographers astray from the right path to success,—so rich in results the one, so poor all the others!

It is very difficult to discover who was the real inventor of anything, from the time of Prometheus down to that of Mr. Snider, who has saved the country an enormous sum of money by his invention for converting our large stock of muzzle-loading rifles into breach-loaders, and who died last week, probably of a broken heart at the shabby treatment he received at the hands of an ungrateful Government. The story of Prometheus is well known. He discovered a method of animating marble statues by the aid of lucifer matches—another invention of his, you know—and what was his reward? Why he was bound to a rock, of which he had a long lease granted to him, and a vulture supplied gratis, to give him a peck every time he moved or had an idea. So it is now-a-days, when a modern Prometheus attempts to set the Thames on fire. "Croak! croak!" says the vulture; "I did that long ago;" and down he pounces with his unclean beak, and worries unfortunate Prometheus till he owns that his idea for a general illumination was only a joke, and that he would much prefer to leave the world in darkness.

In this connection I have a startling question to ask, the awful audacity of which is calculated to make the hair stand on end, and to produce temporary insanity in all who attempt to grapple with it, but for an answer to which the soul of the old photographer is clamorous. It is this. *Does anybody know who invented anything connected with photography?* There is a dualism that has often caused scientific duels running throughout the art. To begin with, I would ask, Did Wedgwood or Sir Humphrey Davy first notice the darkening action of light on nitrate of silver? Or did these gentlemen derive the idea from Scheele? Did Niepce or Daguerre invent the Daguerreotype? Who first discovered the development of a latent image on paper, which was the basis of the Calotype process, Talbot or Reade? The first preserved plates were introduced by two gentlemen who wisely joined interests in the discovery, Messrs. Spiller and Crookes. Who first applied honey to collodion plates, to preserve them, and which process was largely practised at the time, Mr. Shadbolt or Mr. Maxwell Lyte? And (in a parenthesis) what would have become of these and other processes, in which the salts of silver are employed, if Sir John Herschel had not shown the use of hyposulphite of soda?—that much abused and insincere friend of the photographer; better, however, with all its insincerity, than that open foe, cyanide—reversing, for once, the old proverb.

Then, again, who discovered the stereoscope, Euclid Leonardo da Vinci, Wheatstone, or Sir David Brewster?—but this time I think I have the names in regular sequence—who perfected photolithography, Mr. Osborne or Sir Henry James? Who, photo-enamelling, M. Lafon or Mr. Joubert? Then, again, a Frenchman claims Mr. Woodbury's photo-relief process: why, I am at a loss to know. As to carbon printing, we have two things certain; Mungo Ponton undoubtedly pointed out the way, and Mr. Swan was the first to arrive at the goal of perfection, leaving his pursuers nowhere. Worse than all (it is the last straw that breaks the laden camel's back, and this lays me quite prostrate), I have even heard—my ears tingle with the recollection—I think it was in Manchester the other day, that our respected Editor did not invent collodio-chloride, but that it was only a modification of Mr. Sayce's dry negative process with collodio-bromide of silver!—although the Editor had used collodio-bromo-iodide of silver four or five years earlier, and published details—but that, of course, is of no consequence—and *I know* (excuse the italics, I am growing desperate)—see "Echoes," February, 1865,—that an obscure parasite of photography, who, probably, had to ask a friend how to spell his own name, calmly claimed the discovery! What am I to think after this? Shall I, with any confidence, be able to say I know my own name, or that my godfathers and godmothers were kind enough to "then" for me at all?

To return again, for a moment, to Mr. Claudet and the bomb-shell he has thrown amongst photographers, I am glad to hear that it is his intention to publish in a pamphlet all the opinions for or against his process that have been expressed. This will be a valuable publication, and will be eagerly sought by those—and there are many—who take an interest in collecting the curiosities of photographic literature.

At last the possibility of issuing carbon prints in numbers has been satisfactorily proved, the North and South London Societies having presented to their members large prints by this process. The publication of these prints has proved two things: first, that impressions in carbon very much surpass those in silver in beauty, as is very evident when a silver print is placed side by side with one in carbon; secondly, that carbon prints can be produced five or six times as fast as those in silver. I have been informed that Mr. Swan printed twenty-one of the North London picture in one day, and that day in October, while not more than four could have been obtained by the old method. And then as regards permanency, we have not the least doubt, knowing, as we do, of what the image is composed. We have the satisfaction of feeling convinced that, like a thing of beauty which is a joy for ever—

> "It will never
> Pass into nothingness, but *still will keep.*"

I should be sorry to allow a month to pass without again and again urging on the cabinet portrait movement, because I feel that these pictures are destined, if photographers will be true to themselves, to create a revival in the art. To succeed, all the conditions must be followed in their integrity. The size must be strictly adhered to, and the style must not be tampered with. Some photographers—those unfortunates who cannot let well alone—will doubtless endeavour to introduce their own vagaries, and make alterations; but those men I would entreat to let the movement alone altogether; or, what would be much better, to follow the excellent example of Mr. Notman, of Montreal, a photographer in whose footsteps our greatest would not be ashamed to follow. Previous to hearing of the cabinet portraits being introduced into England, he had himself, feeling the necessity of some change in style, been taking portraits a little smaller than the standard that has been agreed upon in this country, and had been to a great expense in preparing for the change, especially in apparatus, frames, and albums. These he has all sacrificed, that his pictures might harmonize with others, and that he may not interfere in the least degree with the success of a movement he feels sure will succeed.

The many applications for relief for distressed photographers that have appeared lately, cry, not so much for individual relief, which is their object, as for a general relief fund for the various branches of the photographic profession. Hundreds are ready to join such an institution, but they want a leader. Are there no business men amongst photographers who would undertake to call a meeting to discuss the subject? As a preliminary, will any member of the profession, in a central position, offer the loan of his rooms for the purpose of such a meeting?

One of the maxims for the conduct of the *Athenæum* seems to be that photography shall never be mentioned in its pages without the art being misunderstood and reviled. It is lamentable to see a Journal which was once the medium through which the earliest discoveries in the art were given to the world, persisting in exhibitions of ignorance that surely must be visible to all its readers. Its latest doings in this way cap everything it has done before,—and we have much to forgive. Mr. Frith has made the mistake of sending the Editor a series of his photographs for review. One of them is apparently a little under-exposed and black, upon which hint the reviewer speaks: "In 'Rydal Water' we have a virgin photograph. On the other hand, the thoroughly sophisticated example from the entrance to 'Bonchurch' has been worked upon so entirely as to possess no more brightness than a drop-scene." And he proceeds to describe how this picture has been ruined by the "tricks of operators who pander to vulgar notions." A "virgin photograph!" O, verdant reviewer! these pictures of Mr. Frith's are all "virgin photographs," and guiltless of the painter's brush, so your superfine advice about the evil results of meddling with a landscape photograph are at least misapplied. Imagine a photographer sending out views at half-a-crown a piece that had been worked upon all over by an artist! If a blunder is worse than a crime, as it is said to be, then, as regards photography (and perhaps in everything else, for you judge the bulk by the sample) how ultra criminal the *Athenæum* must be.

PREPARING CHLORIDE OF GOLD AND VARNISHES.

BY T. S. REEVES.

In all dull times it behoves photographers to study economy, and during no season can such a study be more important than the present. I do not think there is a better way of doing this than by making such preparations as are costly to buy and easy to make. I may mention two: chloride of gold solution, and varnishes. The profit on the last substance is very great. A pint of the best shellac varnish can be made for one shilling and sixpence, and the process is so simple that an errand boy can be intrusted with it.

First. Chloride of Gold.—Take half a sovereign, bend it so as to pass down the neck of a clean oil flask, and add—

Hydrochloric acid	... ...	2½ ounces
Pure nitric acid ...	... ...	1¼ „

Heat gently with a small flame, under a chimney, and in about a quarter of an hour the solution is made, and, when diluted with a pint of water, is fit for forming the toning solution. Nothing can be simpler. It will be known when the gold is dissolved by the red fumes ceasing to be evolved. A white powder will remain undissolved, which is chloride of silver, arising from the small quantity of silver all gold coin contains; it is of no consequence, and can be poured with the gold solution into the pint stock bottle. The flask is then washed out with distilled water, which is poured into the bottle to make up the pint. There is more acid used than necessary; but it shortens the time, and the solution keeps better for it. The copper, which some samples of gold coin contain, does no harm, nor is it, in my hands, any good, although some think it useful.

To make the toning solutions, add two drachms measure to eight or ten ounces of distilled water; put in a pinch of prepared chalk, and shake two or three times; the quantity of chalk is not material, as any excess falls to the bottom, or is separated by filtration. The solution soon becomes colourless, and is fit for use. Half the quantity of gold will do the next day; and will tone well, fifty or sixty cards each time. The same solution does over and over again by adding more water and gold. I only keep out two ounces of gold solution at a time, and that I further dilute with two ounces of water, as in that case losing a drop is only half the loss. Of course you have to use double the bulk now, to make the ten ounces of toning, namely, four drachms the first time, and two the second day.

Negative Varnish is made by taking two ounces of shellac, unbleached, and putting it in a bottle with a pint of the spirit called methylated "finish," and allowing it to stand in a warm place for a day and night, occasionally shaking. A less time will do it by shaking oftener. A filter is then made with paper, and put in a funnel; if large enough to hold the pint, the better. The paper should not project above the funnel, and the latter must be covered with glass, to prevent loss by evaporation. A dry bottle being placed underneath, or a bottle that has had a little spirit in, it can be left to itself for the night. The next morning about half the solution will have passed through, and is fit for use. The funnel is then to be put in the bottle the solution was made in, and a hole made in the paper at its apex. The solution will then pass into the bottle, and the paper filter may be thrown away, with the greater portion of the insoluble matter on it. The same process of filtering is then to be repeated with the remaining solution, which passes through much more freely than the first half. In using, heat the plate gently before applying the varnish.

Bleached lac can be used, but it is dearer, and not so soluble. I coated a negative, one half with the colourless, and the other half with the brown, and I could not perceive any difference in the time of printing. I know there is no novelty in what I have written, but I think there is simplicity in the practice.

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THE RELATIVE INTENSITIES OF SUNLIGHT AND DIFFUSED LIGHT.

A question of considerable importance to photographers, which has hitherto received comparatively little attention, is the relative chemical intensity of sunlight and diffused light. Few attempts have been made to determine the actinic value of each. In printing, it is generally found that an exposure of about six times as long is required in diffused light, as with the same negative, &c., in direct sunlight. In photographing a landscape, however, no such difference in exposure obtains. In some instances the exposure for a sun-lighted scene must be fully as long as if the same view were illumined by diffused light, reflected from abundance of white clouds. The reason for the difference is obvious. In printing, the full penetrating action of direct sunlight is obtained. In photographing the landscape, the exposure must be sufficient, not merely for the sunlit portions, but for those in shadow, which require as much time, or nearly, as if the whole were illumined with diffused light only. In a recent paper by Professor Roscoe and Mr. Baxendell, read at the Royal Society, with a copy of which we have been favoured by Professor Roscoe, some interesting researches on direct and diffused light are recorded, from which we make the following extract:—

The method of determining the chemical intensity of daylight described by one of us[*] presents a convenient means of experimentally comparing the intensity of the chemically active rays which reach the earth's horizontal surface directly from the sun, with that of the same rays reflected from the atmosphere and constituting diffuse daylight. For this purpose it is only necessary alternately to expose pieces of the standard sensitive paper, according to the method described in the memoir above mentioned, to the action of the total light of day, and to the diffuse daylight alone, which is easily done by cutting off the sun's direct rays from the sensitive paper, by throwing upon the paper a shadow cast by a small screen, having an apparent diameter slightly greater than that of the solar disc. In the first case, the chemical intensity of the total daylight, in the second that of the diffuse light, is determined; the difference between these two observations giving the chemical intensity of the direct sunlight. As the experiments which we have already made in this direction have led us to conclusions differing altogether from those derived from theoretical considerations concerning the relative chemical intensities of direct and diffuse sunlight, we think that, although this investigation is incomplete, the results are worthy of the attention of the Society. No direct photometrical determinations of the relative intensity of sun and diffuse light have up to this time been made; but Clausius[†] has calculated this relation for varying altitudes of the sun, founding his calculations upon the hypothesis (generally adopted by meteorologists to explain the red tints of the morning and evening sky) that the diffused light is reflected, not from the particles of air or solid floating material, but from the minute vesicles of water which are supposed to be always contained in large quantities in the atmosphere. According to this hypothesis, Clausius obtained the following numbers as expressing the intensities of direct sunlight and diffused daylight for altitudes varying from 20° to 60°:—

Sun's Altitudes.	Calculated Intensities of		
	Total Daylight.	Diffuse Light.	Direct Sunlight.
20°	0·10049	0·06736	0·03313
25°	0·17808	0·09291	0·08517
30°	0·25933	0·11184	0·14749
35°	0·34049	0·12654	0·21395
40°	0·41957	0·13832	0·28125
50°	0·56686	0·15599	0·41087
60°	0·69442	0·16822	0·52620

(The intensity of sunlight at an altitude of 90°, unweakened by atmospheric absorption, is taken as the unit.)

The measurement of the relative chemical intensities were made at three localities: (1) Owens College, Manchester, 53° 29 N., and 0h. 9m. 0s. W.; (2) the Observatory, Cheetham Hill, near Manchester; and (3) the summit of the Konigstuhl, near Heidelberg, 1,900 feet above the sea, in 49° 24′ N., and 34m. 48s. E. We are indebted for the latter observations to Dr. Wolkoff, who kindly forwarded us his results through Professor Bunsen.

The following experimental numbers, obtained at Owens College, may serve to illustrate the method adopted; in most cases, several (four or five) observations of the intensities of the total and diffuse light were made quickly one after the other, and the mean of all the readings taken.

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[*] Bakerian Lecture, 1865. Phil. Trans. 1865, p. 605.

[†] Poggendorff's 'Annalen,' Bd. lxxii. p. 294.

Table I.—Observations at Owens College, Manchester, 53° 29′ N., 0h. 9m. 0s. W.

Date.	Greenwich Mean Time of Observation.	Sun's Hour Angle.	Sun's Altitude.	Intensity of Total Daylight.	Number of Observations.	Intensity of Diffused Light.	Number of Observations.	Intensity of Direct Sunlight.
1865.	h. m.	° ′	° ′					
Oct. 6.	12 0	0 44 W.	31 17	·073	3	·068	4	·005
7.	9 30	36 42 E.	23 23	·060	1	·056	1	·004
	12 0	0 48 W.	30 54	·063	1	·057	1	·006
18.	11 25	7 18 E.	26 30	·075	2	·056	2	·001
	11 45	2 17 E.	26 46	·111	2	·089	2	·022
	12 30	8 58 W.	26 20	·088	4	·087	4	·001
	1 19	21 13 W.	24 15	·071	4	·069	5	·004
	2 45	42 43 W.	17 8	·062	2	·053	2	·009
24.	0 45	12 51 W.	23 42	·139	3	·113	5	·026
	1 20	21 41 W.	22 4	·123	5	·115	4	·008
Nov. 15.	12 0	1 33 W.	17 55	·101	5	·082	4	·019
	12 40	11 33 W.	17 15	·065	4	·063	5	·002
	1 15	20 18 W.	15 50	·063	4	·058	5	·005
21.	12 10	3 43 W.	16 27	·056	5	·055	4	·001
	12 30	8 43 W.	16 8	·066	4	·058	5	·008
	12 45	12 28 W.	15 44	·058	4	·050	5	·008

As the altitudes here observed vary only from 15° 44′ to 31° 47′, we thought it best to collect the results into two groups, containing the eight highest and eight lowest observed altitudes.

Table II.—Results of Observations at Owens College.

	Number of Observations.		Mean Altitude of Sun.	Intensity of Sky or Diffused Daylight.	Intensity of Direct Sunlight.	Ratio of Sun to Sky.
	Sky.	Sun.				
			° ′			
Group 1	33	34	17 8	·066	·007	0·106
2	20	24	26 38	·074	·008	0·108

The determinations made at Cheetham Hill (53° 30′ 50″ N., and 0h. 8m. 56s. W.) were sixty-three in number, in which the altitude varies from 16° 8′ to 46° 14′, and these are divided into three groups, as follows:—

Table III.—Results of Observations at Cheetham Hill.

	Number of Observations.		Mean Altitude of Sun.	Intensity of Sky or Diffused Daylight.	Intensity of Direct Sunlight.	Ratio of Sun to Sky.
	Sky.	Sun.				
			° ′			
Group 1	23	24	19 30	·064	·012	0·187
2	22	22	25 31	·091	·019	0·208
3	18	17	34 8	·104	·026	0·250

The range of altitude in the Heidelberg experiments being a much wider one (viz., from 0° to 63° 49′), we have been able to arrange these (containing ninety-nine observations) in five groups, as follows:—

Table IV.—Results of Observations at Heidelberg.

	Number of Observations.	Range of Altitude of Sun.	Mean Altitude of Sun.	Intensity of Sky or Diffused Daylight.	Intensity of Direct Sunlight.	Ratio of Sun to Sky.
		° ′	° ′			
Group 1	10	0 to 15	7 15	·048	·002	0·041
2	19	15 — 30	24 43	·134	·066	0 472
3	31	30 — 45	34 34	·170	·136	0·800
4	22	45 — 60	53 37	·174	·263	1·511
5	17	above 60	62 30	·199	·319	1·603

In the following table the experimental ratios are compared with those calculated by Clausius.

Table V.—Ratio of Chemical Intensities of Direct Sunlight to Diffuse Light.

Sun's Altitude.	Calculated (Clausius).	Experiments.		
		Heidelberg.	Cheetham Hill.	Owens College.
20°	0·491	0·350	0·19	0·10
25	0·896	0·480	0 20	0 11
30	1·320	0·650	0·23	
35	1·690	0·820	0·26	
40	2·032	1·00	—	
50	2·634	1·37	—	
60	3·129	1·60	—	

These numbers show that whilst at 20° of altitude, according to theory, the relation of the intensities of diffuse light to direct sunlight is as 100 to 49·1, the experiments at Heidelberg give a relation of 100 to 35; those at Cheetham Hill, 100 to 19; and those in Manchester, 100 to 10. If we compare the theoretical ratio for higher altitudes, we find that in our latitudes the ratio even at 35° of altitude is only as 100 for diffuse light to 26 for sunlight, whereas theory gives the relation as 100 to 169. The Heidelberg observations show indeed a more rapid rise in the intensity of the direct sun's rays, the ratio reaching 100 to 82 for 35° of altitude. The great difference between these and the other experimental results must doubtless be ascribed to the considerable elevation (1,900 feet above the sea) at which these observations were made.

Even at Heidelberg, however, no less than eight observations show that at low elevations the chemical action of the sun becomes altogether inappreciable, whilst that of the diffuse light is still considerable; and the same inactive condition of direct sunlight at low altitudes has been frequently observed, both at Owens College and Cheetham Hill. In these cases the intensity of the sun's direct visual rays was considerable, and a strong shadow was cast; but the more highly refrangible rays were altogether absent, and the ratio became infinite.

Heidelberg Observations.

Altitude.	Direct Sun.	Diffuse Light.
° ′		
0 34	0·000	0 026
1 32	0·000	0·024
2 29	0·000	0·038
3 27	0 000	0·028
6 0	0·000	0·030
10 40	0·000	0·083
11 51	0·000	0·079
12 58	0·000	0·080

In some of the experiments made at Cheetham Hill the shadow of a small disc was thrown on a horizontal surface of white paper, and careful estimations made of the relative brightness of the shaded and unshaded portions of the surface. A comparison of these results with those obtained at the same time for the chemical rays showed that with the sun at a mean altitude of 25° 16′, the mean ratio of the chemical intensities of direct and diffused light being 0·23, that of the luminous intensities was 4·00, or that the action of the atmosphere was 17·4 times greater on the chemically active than on the luminous rays of sunlight. A series of photometrical experiments made afterwards at Owens College gave the following results:—

Mean altitude of the sun ... ... 12° 3′
Mean ratio of chemical intensity ... ... 0·053
Mean ratio of luminous intensity ... ... 1·400

It appears, therefore, that with the sun at an altitude of 12° 3′, the action of the atmosphere was 26·4 greater on the chemical than on the luminous rays.

The foregoing experiments appear to prove—

I. That the effect of the atmosphere upon the highly refrangible and chemically active solar rays is regulated by totally different laws from those founded upon the hypothesis of the reflexion by means of hollow vesicles of water.

II. That the ratio of the chemical intensity of direct to diffuse sunlight for a given altitude of the sun at different localities is not constant, varying with the transparency, &c., of the atmosphere.

III. That this ratio of "chemical" intensity does not in the least correspond to the ratio of "visible" intensity as estimated by the eye; the action of the atmosphere being 17·4 times greater upon the chemical than on the luminous rays when the sun's altitude is about 25° 16′, and 26·4 times greater when the sun's altitude is 12° 3′.

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EXPERIMENTS ON THE QUALITIES OF LENSES.

BY DR. H. VOGEL.

In April this year we made a series of experiments with the double objective of M. Voigtlander, which we proved both as a whole, and in regard to the quality of the front lens.

The results thereby obtained, which exactly fixed the size of the angle of view, and of the angle of the largest picture, are important aids in judging of the perfectness of an objective.

We therefore continued these proofs, and examined the following objectives :—Dallmeyer's wide-angle lens, Busch's triple lens, and Dallmeyer's triple lens. From the beginning we remarked that the results have no validity except for the special instruments tested, and that with different examples of the same form of lens, the size of the largest image, and that of the angle of view, are always a little fluctuating.

The experiments were performed in the following manner : —The objectives were screwed to a large camera, and directed to a tower about 500 feet distant (in the foreground there was the court-yard of the Royal Polytechnic Academy), and then an image was made on a large plate. On this plate the circle of illumination was distinctly visible, its centre was marked, and the radius exactly measured, which formed the base for fixing the angle of sight. Measuring the luminous circle exactly, however, is a little difficult, since it is not sharply limited. Mistakes of one millimetre may be therefore very easily made, but they alter the result in regard to the angle of sight only very slightly. Now the size of the tower was measured, and compared to the size of the same object on a plate taken some time before with Voigtlander's landscape lens ; the focal distances are then to each other in proportion as the respective sizes, and therefore the focal distances of one lens may be calculated if that of the other be known. The focal distance of Voigtlander's simple lens was fixed by measuring the distance of the ground glass from the lens. For instance, the focal length of Voigtlander's lens was 330 millimetres, the size of the tower on the image made thereby 24·5 millimetres, the size of the tower on the plate, made by Dallmeyer's wide angle lens, 13·75 millimetres. Thus

$$24{\cdot}5 : 13{\cdot}75 = 330 : x; \text{ whence results}$$
$$x = 185{\cdot}2 \text{ millimetres.}$$

In similar manner the focal distances of the other objectives were fixed. The semi-diameter of the luminous circle, divided by the focal length thus obtained, gives the tangent of one half of the angle of view.

These determinations are most easy. More difficult, however, is the determination of the size of the largest picture. Here the experimental plates are to be compared very exactly, in order to observe in which way the sharpness decreases towards the margin. For this purpose it is extremely important that in maniplating they be sharply focussed in quite the same manner, and kept exactly in the same position. The result is more favourable if, as recommended by Mr. Dallmeyer, the camera is not focussed to the centre of the image, but to a point about one-third of the size of picture distant from the centre. Opinions on the sufficiency of sharpness will, according to the individual point of view, be a little various, and therefore uniformity will be difficult. Moreover, the objects taken must here be considered ; if these be focussed for judging of sharpness, at a front of houses, or at a drawing, the resulting picture is more limited than if a court-yard or a street be used for object, where the foreground is approaching at the sides, and becomes thereby more sharp. If different objectives are to be compared, the size of stops must be noted. The size alone of the stop, however, is not sufficient, but the relation between the aperture of the stop and the focal length. In our experiments, a front of buildings situated before the apparatus was used for judging of the sharpness, after having exactly focussed to the centre of the picture. The size of picture thus obtained may be therefore regarded as a minimum of the performance ; and indeed these instruments allowed us to make much larger pictures when they were pointed at a street view. It is therefore useless to fix the size of the picture as far as parts of a millimetre.

We then measured, after having marked the limit of the sharpness fit for use, its distance from the visual centre on the experimental plate, divided it by the focal length, and obtained thus the tangent of the half angle of picture, by which, by means of a trigonometrical table, the angle of picture might be easily determined. These were the results obtained.

Lenses.	Focal length Millimetres.	Angle of Sight.	Size of stop divided by the focal length.	Largest angle of Picture.
Voigtlander's landscape lens, the front lens of the Voigtlander portrait lens mentioned beneath	330	62° 15′	0·0303	33° 45′
Dallmeyer's wide-angle lens No. 1	185·2	71° 5′	0·0260	54° 30′
Busch's triple-lens No. 3	363	62°	0·0193	47° 40′
Dallmeyer's triple-lens, No. 1.	208	70° 40′	0·0277	44° 30′
Voigtlander's portrait-lens, Sitter D.	230·4	43° 50′	0·143	22° 10′

The latter gave, with the above-mentioned aperture of stop, a light strong picture of card size. We may observe, by this table, that Dallmeyer's wide-angle lens, although it has almost the same angle of view as the triple lens No. I, surpasses it nevertheless by 10° in regard to the angle of largest picture, when the apertures of stops are almost equal. Moreover, we note the smallness of the angle of view of Busch's triple lens, if we compare it with Dallmeyer's triple lens. Notwithstanding, the angle of largest picture is greater with Busch, which is explained by the smallness of his stop.

Thus is shown the importance of carefully noting the relations of aperture and focal length in all comparisons of lenses. But with the results above-mentioned, the qualities of the lenses are not sufficiently described. Two of the most important points, the actinic power and the brilliancy of the picture, are wholly neglected. We have no means of exactly measuring the first, and we can judge only on this point in working much with the different lenses under the same circumstances. In my practice, I have found that of all the lenses above-mentioned, the Dallmeyer wide-angle lenses are the most excellent in regard to brilliancy of picture and actinic power. Therefore, I use it with great satisfaction, not only for landscapes, but also for interiors ; the little curvature of lines is not important, even in the latter.

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THE REDUCTION OF PHOTOGRAPHIC WASTES BY NITRIC ACID.

A Correspondent of *Humphrey's Journal* says :—

I notice in one of the latest numbers of your valuable Journal, an article on the reduction of photographic wastes by nitric acid ; and having had considerable experience in the business, should like to make a few remarks in regard to it.

The writer seems to have been under the impression that the silver contained in the ashes is all in the metallic state. This is erroneous. An accurate analysis of the ashes of paper sensitized in a 60-grain bath gives the following results in 100 parts of ashes contained :—

Metallic silver...	35·90
Organic compounds of silver	20·05
Chloride of silver	17·05
Oxide of silver	2·37
Ashes ...	24·63
Total ...	100·00

The organic compounds of silver (20·05), and the chloride (17·05), are insoluble in nitric acid. Consequently there would be a loss by this process of nearly thirty-eight per cent., without calling into account the quantity of solution absorbed by the ashes left behind.

Again, if there be but a trace of iron present—(for in what photographic wastes is there not ?)—it would positively spoil the silver bath, as it is converted by this process into a perfectly soluble compound—the nitrate of iron.

Secondly, the ashes of the paper are very impure, containing many foreign substances, which, passing into solution, become fatal to the silver bath.

[See the remarks of Mr. Spiller on this subject a few weeks ago, p. 483.—Ed. Photo. News.]

ON A NEW METHOD FOR THE PRODUCTION OF GLASS POSITIVES.

BY PROFESSOR H. SCHWARZ.*

Some time since I instituted a few experiments with a view of observing the results produced by developing a negative with a solution of tartrate of silver, either alone, or mixed with ammoniacal oxide of silver. I found that if I employed these compounds by themselves, without having recourse to the ordinary method of development with pyrogallic acid or sulphate of iron, no very satisfactory results were obtained; but if a negative developed in the usual manner and fixed with hyposulphite of soda were subsequently treated with these silver solutions, a somewhat remarkable effect was produced. It was nothing less than the conversion of the negative into a positive; and the result was even more striking if the negative had first been developed with the double sulphate of iron and ammonia. When treated with this compound silver solution, the negative gradually disappears altogether, and soon afterwards a remarkably vigorous positive becomes visible. If now the picture be carefully examined, it will be found to possess a most curious appearance; by transmitted light it still retains the character of a negative, whereas if viewed by reflection it is a most decided and sharply-defined positive.

It is well known that glass positives are much superior, both in definition and softness, to those on paper. The most delicate shadows and the finest hair-lines are faithfully reproduced, and no touching up whatever is required. Positives on glass may likewise be successfully tinted by colouring them on the prepared surface.

I prepare my solutions in the following manner:—340 grammes of nitrate of silver are dissolved in 500 cubic centimetres of boiling water, and 282 grammes of Rochelle salt are also dissolved in a similar quantity of hot water. Both solutions are mixed, whilst in a boiling condition, in a large flask, and boiled for half an hour. The mixture is filtered while hot, and then allowed to cool. A few crystals of tartrate of silver should be precipitated when the mixture is cold, proving that the solution is perfectly saturated.

My second compound is prepared by dissolving 170 grammes of nitrate of silver in about 80 cub. cent. of water. Three-quarters of this quantity is put into a vessel, and a dilute solution of caustic ammonia is gradually added till all precipitated matter has disappeared. When this is the case, the remaining portion of the solution is added, rendering the mixture somewhat turbid, and the whole is then carefully filtered.

These two solutions are mixed in the proportion of two parts of the former to one of the latter, but should not be put together before they are actually required for use.

The negative, having been developed and fixed, is thoroughly washed, and while yet moist the silver solution is poured over it. The solution is made to flow equally over the plate, and allowed to remain in contact till the change has been effected and the requisite vigour attained. It is then washed and dried. When finished, it is better not to varnish it, but simply to cover it with a sheet of glass; if the picture has not been sufficiently developed, the varnish gives it a bright and flat appearance; and if, on the other hand, it has been over-developed, the varnish renders it somewhat indistinct and foggy.

The production of these pictures is easily explained. The silver solution percolates through the light portions of the negative where the collodion film is more porous, and forms a bright metallic surface against the glass, thus producing shadows similar to those in a Daguerreotype. The darker portions of the negative consist of a deposit of dull metallic silver, and the application of the silver solution to these parts merely has the effect of increasing this deposit, and thus forming the high lights of the picture.

A photograph produced by this method has the appearance of a fine crayon drawing.

PHOTOGRAPHING CRIMINALS.*

The credit which has been denied to photography on the score of art capacity must be conceded to its literal fidelity in rendering facts. That it is not imaginative, that it cannot modify or omit details from its presentments, becomes, in many cases, its cardinal virtue. If it nothing extenuate, it sets down naught in malice, and when it enters the witness-box, its evidence leaves little room for doubt. Hence it has taken an important place as an auxiliary to the administration of justice, both in civil and criminal cases. In multiplying indisputable fac-similes of important documents, in indicating pictorially the relative positions of disputed territory, its use is obvious. But it is in its aid to the discovery of identity in persons charged with crime that its legal use is most important. Nearly twelve years ago, Mr. J. A. Gardiner, Governor of Bristol Gaol, addressed a letter to the Governors of Her Majesty's gaols generally, pointing out the importance of preserving a photographic record of the prisoners under their charge—a veritable rogue's gallery! which might be a rare study to the disciples of Lavater. It was not with a view to the study and classification of physiognomical types that Mr. Gardiner proposed to secure sun drawings of his enforced guests, but solely with a view to their identification when they visited gaol a second time. "It is well known to all," he said, "who have been concerned in criminal administration, that the most cunning, the most skilled, and the most daring offenders, are migratory in their habits; that they do not locate themselves in any particular town or district, but extend their ravages to wherever there is the most open field for crime;" the best planned robberies, he adds, being rarely conducted by the resident thieves in any district. This migratory, or Bohemian tendency, diminished the risk of identification in the exact ratio in which it brought the criminals within fresh judicial districts and under fresh official inspection, and often permitted expert professional thieves, hardened criminals, to pass off lightly as first offenders, only just stepping out of the path of rectitude. Written descriptions were rarely found sufficiently precise for identification, and hence Mr. Gardiner was induced to try photography, which he found most efficient for the purpose, and strongly recommended for systematic adoption to his brother governors. The success which attended the partial adoption of this plan induced a Select Committee of the House of Lords, on whose Report the Prison Act of 1865 was framed, to recommend its universal adoption in Her Majesty's prisons.† For some unexplained reason, the Secre-

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* *Photographisches Archiv.*

* *British Quarterly Review.*

† "Although the proof of former convictions is not one which is directly involved in the question of prison discipline, the attention of the committee has so frequently, during the course of examination, been drawn to the great public inconvenience which is felt from the difficulty in identifying a previously convicted prisoner, that they cannot close their report without indicating both the extent of the evil and the suggestion of a remedy. The committee are satisfied that it is of the greatest importance that those offenders who are commencing a course of crime should be made aware that each repetition of it, duly recorded and proved, will involve a material increase of punishment, pain, and inconvenience to them.

"Sir W. Crofton states with great clearness, the prejudicial effect which the difficulty of identifying previously convicted prisoners has had in Ireland, and he has indicated photography as a simple means by which it has been in a great measure obviated.

"The governors of Bristol, Wakefield, and Leeds gaols corroborate the advantage of the use of photography. Mr. Gardiner says: 'I introduced, some years ago (indeed, I was the first who introduced them) the Daguerreotype portraits of the prisoners, and, from having succeeded in one or two cases, we introduced it more freely; we now take a large number of portraits, and I think it would be very difficult for a man to escape detection in our gaol. I take a stereoscopic picture instead of a plain portrait tary of State did not see fit to adopt the recommendation, and photography is only employed where the governors of gaols themselves see its importance.

Where the system is adopted, the portrait of every criminal is taken as soon as he arrives at the gaol, and prints from this negative are circulated, attached to a printed form, in which a description is given, including details of age, height, complexion, hair, eyes, nose, whiskers, and specific marks, and also the account which the prisoner gives of his place of birth, last residence, education, trade, religion, &c. The circular, containing the portrait and these particulars, is forwarded by the governor to the governor of a neighbouring gaol, stating that "the prisoner above described is in custody for trial;" and a request is added that, if he is recognized as having been in custody before, particulars may be forwarded, and also that the circular may be forwarded to the next gaol marked in the route annexed. Thus the document passes through a prescribed route, receiving, as it travels, the testimony of various governors, intimating that the prisoner is "not known," or that he was convicted at any former period, generally under some other name than that now assumed, and is finally returned to the gaol from whence it was issued, furnishing at times curious facts in the statistics of crime, and in the biography of gaol-birds.

As may readily be conceived, the prison limner is not often favoured with willing sitters, and strange are the devices by which the cunning of the criminal is manifested in evading this unerring mode of personal identification, which he regards as taking a mean advantage of him. Some treat the attempt with open defiance, resolutely refusing to sit still during the operation; others, with a mock air of submission, sit perfectly quiet during the preliminary arrangements and focussing operation, but move sufficiently at the vital moment of exposure; others, who pretend to have no objection to be portrayed, contrive to produce such an amount of facial contortion, by squinting, twisting of the mouth, &c., as will effectually destroy identity in the portrait. In some cases this cunning is met with resolute perseverance, and in others with stratagem, so that in all cases a sufficiently characteristic likeness is obtained. One governor informs us that he generally contrives that the operation shall take place just before dinner, and refractory sitters are informed that no dinner will be dispensed until the portrait has been obtained, a practical argument, the force of which is generally recognised. In another gaol, after the sitter has, by movement or contortion, baffled the portraitist, he, or still more commonly she, is handed to a seat in a well-lighted place, to rest awhile and watch the operation repeated with the next criminal. The sitter, just rejoicing in the cunning which has defeated the attempt of the photographer, generally sits perfectly still, watching with eager interest the operation for which another is sitting. In the meantime, a concealed camera, within range of which the first victim had been placed, is doing its work, and a natural and characteristic likeness is obtained of the unconscious criminal, who had apparently retired master of the situation.

A strange and sad gallery of portraits, not quite denuded of individuality by close-cropped hair and prison grey garb; the portraits being often secured in the guise in which the culprit comes into the hands of justice. A series forwarded to the writer, by the excellent governor of Carlisle Gaol, himself an accomplished photographer, might furnish a mournful theme for the moralist. Not all brutalized, or besotted, or sinister; not all with the forehead villanous low, the square jaw, the coarse mouth, or the eye of wild beast; but in more cases a weak and weary, or a craven and humbled look. Some of the faces remind us painfully of another series of portraits, taken by Dr. Hugh Diamond, of insane persons, and suggest to us the connection between diseased morals and diseased minds, between crime and insanity. Physiognomy, to the careful observer, may often, doubtless, indicate tendencies of character, and suggest phases of mental history. None of the portraits before us look intellectual, or suggest culture; they are mostly of a low type; but there is nothing to suggest the dogged, resisting, vindictive beings, with overhanging felon-brow and sunken cruel eyes, which sensation writers at times attribute to the criminal classes. They are rather examples of God's image degraded and enfeebled by neglect; plants which resemble weeds, because left without culture. The only portrait marked as that of a murderer is that of a weak but not imbecile-looking old man, the mildest in expression amongst a score of criminals.

Photography, as the auxiliary of the detective in tracking the criminal flying from justice, renders most important service.* The photograph of Muller, the murderer of Mr. Briggs, became practically his death warrant. It supplied the jeweller, who bought the plundered chain, with a means of identifying the foreign-looking person who sold it, and rendered the officer of justice, who had never seen him, familiar with his features, so that he detected him amongst the crowd of passengers on the deck of the "Victoria" when on a fine summer day, it entered the bay of New York, to give, in a few hours, the murderer liberty in a new world. The "card" of the absconding fraudulent debtor or embezzling clerk is placed in the hands of Inspector Bucket, and he starts off without hesitation to Australia or America to apprehend a man he has never seen. The universality of photographic portraiture has been singularly useful in this respect. There are few men, open in any degree to the sympathies of their kind, who have not at some time sat for a photograph, little dreaming of the weapon it placed in the hands of their pursuers should they at any time step into the paths of crime.

The powers of this silent witness have, however, led to singular exaggeration, and the lovers of the marvellous have been treated from time to time with records of the detection of murderers by the image remaining on the dead eye of the victim, which, duly magnified and photographed, has borne swift witness against the criminal. It is needless to say that this is an absurd impossibility. The retina of the eye retains the impression of an object so long as that object is before it, as does a mirror, and no longer. It has never been alleged, indeed, that the dead eye retained impressions, except in the case of murdered persons; the common belief in the Nemesis which attends the man-slayer having apparently generated this superstition in the domain of science.

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Correspondence.

A TALE OF TWO GIANTS—ART AND PHOTOGRAPHY.

Sir,—Having read a story of the "Two Giants" in your last number of the Photographic News, I could not help feeling that your correspondent had been listening to a tale of partiality or prejudice. The following appears more probable. Man saw that the works of God were most beautiful,

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and I request the parties to whom I send it to put it into the stereoscope. They have a better opportunity of seeing the man before them standing out in relief. We merely take portraits of those whom we do not know,—railway thieves, and strangers to the city, who are taken up for picking pockets at the railway stations and in railway carriages. We have found out a great many by that means. On one occasion I recollect an officer of mine being offered a large sum of money, by the wife of a prisoner, to release him. He was offered £100. This was reported to me, and I thought, as the man had only three months more to serve, he certainly must be wanting somewhere else. I took his portrait directly, and sent it round to perhaps 40 or 50 different gaols, and he was recognized at last at Dover. I had an order from the Secretary of State to remove him instead of discharging him. I removed him on a Friday, and on the following Friday he was sentenced to fifteen years' transportation for highway robbery;' and the committee strongly recommend the further extension of this system, which is inexpensive, effective, and wholly free from objection."—'Report of Select Committee on Prison Discipline.'

* We understand that the London Stereoscopic and Photographic Company, one of the largest productive houses in every branch of photography, frequently receive from Scotland Yard instructions to produce as many as 2,000 copies of the portrait of an important criminal at large and wanted by the police.

but that all, however perfect, was subject to decay; that age took away the bloom and brightness of the face he loved, and winter swept away the summer scene; and sighed. "It must be so!" A good and holy spirit whispered, "Use the heavenly gift of intellect;" and shewed the way to reproduce those beauties. Taught by Art, behold the glorious works produced; the good, the great, the beautiful, before us always! And has not this been done by closely copying Nature in all her varying, "ever varying" phases. But, the time came when Art beheld her sons leaving the truthful, schools of Nature, for the sake of following Imagination "and, as a stern admonitor," sent the pre-Raffaelite, to show the early style which led to excellence. Science, also, like a good and loving sister, lent her aid, and taught Photography, thus showing the misguided artist, Nature as reflected in a mirror; and now, with Art and Science, Truth and Nature aiding, ask such men as Rejlander, Blanchard, and others who are both artists and photographists, what may not be achieved?—I remain, sir, your obedient servant,

CHARLES TAYLOR, Artist and Photographist.

Andover, Hants, October 29th, 1866.

A PHOTOGRAPHER'S RELIEF FUND.

SIR,—I am very much pleased with the spirited article written by your worthy correspondent Mr. Bovey, asking the co-operation of photographers in the formation of a Relief Fund. True hunger is a sharp and bitter thorn, and while we row in life's boat we are never safe from the calamities and afflictions life is so prone to.

This year I speak from experience. In a few hours all I possessed, to earn my daily bread, was destroyed by fire. My employer gave me no satisfaction, no recompence; therefore I can truly feel for others, and it teaches me a true lesson, "Prepare for the worst;" and though only just commenced working again, I cannot let such an opportunity pass. But to respond, and offer my mite, and also to subscribe quarterly or yearly for the good work to be done; and would suggest a movement in the many large establishments—cards for collecting. I feel confident we cannot do too much to raise an institution for so noble an object, our "Poor and Sick Brethren." I myself will collect what I can from my own personal friends, amateurs, &c., and shall try and use my influence with other professional men; and should my letter be read by the class of men like myself, "Operators," let me not ask in vain of them to assist also, and let the world see we can, like other grades and professions, feel for our poor brethren, and assist them when the hour of need arives. And I have no doubt we can, with the kind assistance which you, Mr. Editor, and other gentlemen who have so generously and nobly offered their assistance. We have only now to respond, give our mite, and raise "something" that will do honour to our profession. I shall be most happy to assist, and do anything my humble efforts will allow. It will be a pleasing duty, worthy sir, to help you in your good work.—Remaining, yours &c.,

6, *Oakley Terrace, Plymouth.* LUX ET SALUS.

HOW TO FIND THE PHILOSOPHER'S STONE.

SIR,—It may interest many of your readers to point out how, in the earliest days of alchymy, ages before chemistry was a science, the action of solar light was regarded as the chief agency in nature. Perhaps some of your readers, who are fond of experiments, will be interested in an old prescription how to find the Philosopher's Stone. There probably is something omitted in the prescription, but that may be ascertained in the hands of a skilful operator. The prescription professes to be handed down from Hermes Trismegistus. He is supposed to be the same person with Chanaan the son of Ham, whose son, Mizraim, first occupied and peopled Egypt.

Plutarch informs us that Egypt was sometimes called Chemia. This name is supposed to be derived from Chanaan, thence it was believed that Chanaan was the true inventor of alchymy. Whether the Hermes of the Greeks was the same person with Chanaan or his son Mizraim, it is impossible at this distance of time to decide; but to Hermes is assigned the invention of alchymy, or the art of making gold, by the unanimous consent of the adepts. Albert Magnus informs us that Alexander the Great discovered the sepulchre of Hermes, in one of his journeys, full of golden treasures, and written on this tablet of Zatadia, which others called Emerald, was the following passages. It would appear this Emerald Table was alluded to by Aviciema and other Arabian writers. The following is a literal translation of this famous inscription from the Latin, by Kriegsmann:—

1st. I speak not fictitious things, but what is true and most certain.

2nd. What is below is like that which is above, and that which is above is similar to that which is below, to accomplish the miracle of one thing.

3rd. All things were produced by the mediation of one Being, so all things were produced from one thing by adaptation.

4th. The father is Sol, its mother is Luna, the Wind carried it in its belly, the Earth is its nurse.

5th. It is the cause of all perfection throughout the world.

6th. Its power is perfect if it be changed into earth.

7th. Separate the earth from the fire, the subtle from the gross, acting prudently, and with judgment.

8th. Ascend with the greatest sagacity from the Earth to Heaven, and then again descend to the Earth and unite with things superior and things inferior; thus you will possess the glory of the whole world, and all obscurity will fly away from you.

9th. This thing hath more fortitude than fortitude itself, because it will overcome every subtle thing, and penetrate every solid thing.

10th. By this the world was formed.

11th. Hence proceed wonderful things which in this wise were established.

12th. For this reason I am called Hermes Trismegistus, because I possess three parts of the philosophy of the whole world.

13th. What I have to say about the operation of Sol is completed.

Such is the literal translation of the celebrated inscription on the Emerald Tablet. The two individuals who have devoted most time to illustrate the tablet are Kreigsmann and Gerard Dornens, whose commentaries may be seen in the first volume of the Mangetus's Bibliotheca Chemica.

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Talk in the Studio.

THE EXHIBITION OF 1867.—We understand that the catalogue is already in course of printing, proofs being sent to each contributor for verification or correction. Those, therefore, who have accepted space must not neglect, under any circumstances, to fill it, otherwise their names will appear in the catalogue, and thus, if no contributions appear, single them out as defaulters.

RAPIDITY AND CERTAINTY OF CARBON PRINTING.—In a recent letter from Mr. Swan, referring to Mr. Robinson's 16 by 12 negative, "Waiting for the Boat," he states that on the previous day, in the month of October, twenty-one prints were obtained, only one in that number having any drawback, the rest being quite perfect. Such a fact speaks volumes, not only for the rapidity, but for the certainty of the process.

MEDALS FOR THE DISCOVERY OF PHOTOGRAPHY AND THE ELECTRIC TELEGRAPH.—Two medals, of large diameter, have recently been struck at the Mint at Paris, to commemorate the two principal discoveries of the age, photography and the electric telegraph, The dies were engraved by the two eminent artists, MM. Oudiné and Bovy. Photography, by M. Oudiné, is allegorically represented. A female figure holds in one hand a metallic plate, whilst the other, pointing to the heavens, commands the light to print on it the required image. The nobleness of the attitude and of gesture, the good arrangement of drapery, all tend happily to express the idea of science subduing matter, and converting the sun to an obedient servant. Another female figure, or rather winged genius, represents the electric telegraph; her feet just touch a galvanic battery, and her arms extend over the dials of the instruments, whilst telegraphic wires crossing each other seem to seize on its passage the thought that flies from pole to pole, and write it by means of nimble pens. The lightness and grace required for such a subject have found an elegant interpreter in M. Bovy. The figure, though somewhat ethereal, is treated with exquisite feeling, and the floating draperies have the motion, the suppleness, that is so admired in the works of Coysevox, Lemoyne, Couston. These medals may be purchased at the sales room of the Hotel des Monnaies.—*Journal of the Society of Arts.*

Shocking Death of a Child from Cyanide.—An inquest was recently held, in Thomas Street West, Ferry Road, Poplar, on the body of James Ellis, aged three years. The deceased had got to a cupborad where a bottle of cyanide of potassium was kept, and drank a quantity of the liquid. The deceased expired shortly after. The jury returned a verdict of death from cyanide of potassium taken by misadventure.

Royal Cornwall Polytechnic.—A correspondent says:—"Mr. Sydney Hodges, whose name is well known to the readers of the News, and who has done so much in the cause of photography at the above popular institution, has resigned his appointment as one of the secretaries, his residence and professional engagements at Torquay demanding the whole of his time and attention. As he was the first to make photography a 'feature' in the Polytechnic Exhibition, coupled with his ready attention to the interests of photographers, and unvarying civility, he will carry with him the best wishes of a large number of amateur and professional manipulators."

Enlargements and Cabinet Pictures.—A correspondent says:—"These pictures are getting very popular in the West, and the leading photographers of Falmouth, Penzance, Plymouth, Redruth, and Truro, are introducing them with great success."

Safety from Fire.—Our correspondent, "A Practical Man," writes: "An article appeared last April in this publication, in which I clearly demonstrated that photographic studios, theatres, music halls, &c., &c., could be rendered thoroughly fire-proof by the use of soluble glass. Many years back I urged on those most interested in theatres and public buildings, &c., the use of the same agent, but met with little encouragement or attention. I have now to record the destruction of a photographic studio at Newton Abbot, Devon, within a few miles of Torquay, in the occupation of Mr. C. Truscott. The whole was soon reduced to a heap of ashes."

Clean Hands.—A correspondent says:—"There is a great objection to the use of chloride of lime and glauber salts for cleaning the hands, and that is, it leaves such a disagreeable smell. This may be entirely avoided by the liberal use of lemon juice, which not only removes the smell, but whitens the hands. Lemons being rather dear, rotten ones may be used, and answer well."

Piracy and Bankruptcy.—The case of W. Johnson, before referred to as convicted of piracy on the complaint of Mr. Graves, again appeared before Mr. Commissioner Winslow, applying to be released from custody. Eight penalties of £10 had been inflicted, but the debtor being unable to pay them, executed a deed under the 192nd section of the Act, and having duly registered the same, he obtained protection. Notwithstanding such protection, the debtor was arrested at the suit of Mr. Graves for recovery of one of the penalties, and he then applied to be released from custody. His Honour, in giving judgment upon the application on Saturday week, held that the Court had jurisdiction to grant the release, but the further consideration of the matter was reserved to give Mr. Graves an opportunity of testing the validity of the deed. Evidence has been accordingly taken upon that point, and the case again came before the Court. Mr. Bagley, for Mr. Graves, now contended that the deed had been got up, not for the purpose of benefiting the creditors, but with the sole object of defeating the claim of Mr. Graves to the penalties which he had recovered. He urged also, that even if the Court had jurisdiction to release the debtor, it would not, in the exercise of its judicial discretion, grant such release. The learned counsel said that to adopt such a course would be, under the circumstances, quite opposed to the interests of public justice. He referred, in the course of his argument, to the case of *ex parte* Waugh, where the Lord Chancellor, upon appeal, had reversed a decision of this Court, allowing the bankrupt his release. After hearing Mr. Reed, his Honour said that the debtor had been arrested in defiance of the protection which had been granted him, and as the deed which he had executed could not be impeached, he should grant the release.

Cabinet Portraits.—We are glad to learn that cabinet portraits are gradually becoming favourites in the provinces. From abroad the accounts are equally favourable. Mr. Notman, of Montreal, says: "Since I last wrote you I have been thinking over the matter of the new size, and although I had previously ordered albums and carte mounts for the size I proposed, I think I shall try and make use of them in some other way, rather than run the risk of conflicting, and I hope by a general adoption of the cabinet that a happy influence may be the result." An example he sends us is very charming: whilst the same size is preserved as to print and mount, the figure is rendered in somewhat smaller proportions, and is graceful and effective. Dr. Vogel informs us that the portraitists in Berlin have adopted and are pushing the new size with success, the usual prices being 9 thalers (27s.) per dozen.

Magnesium Light.—Mr. Solomon informs us that by a simple addition to his magnesium lamps, by which the light is enclosed in a tube something like that of an argand burner, a great improvement is effected, the light being more steady, and a saving of about 50 per cent. effected.

The Vapours of Ether putting out Fire.—A paragraph in a contemporary describes the explosion of some bottles of ether as putting out a fire. We quote the paragraph below, but we should not recommend our readers to put any faith in the idea that the vapour of ether will extinguish fire. Photographers ought to remember that few things are more inflammable or more difficult to extinguish than the vapour of ether:—"A fire broke out on Saturday in the cellar of a druggist, named Christian, in the Avenue Montaigne, Paris, and was brought to a termination in a singular manner. A boy had let a lighted lucifer fall on some rags, which became ignited, and the flames spread to some bottles and carboys containing various kinds of spirits and alcohol; these bursting soon flooded the cellar with a blazing liquid, which emitted a flame so suffocating that the firemen were unable to enter. Suddenly a loud explosion was heard, and the flames became extinguished, as if by enchantment. Three bottles of sulphuric ether, containing in all about three quarts, had burst, and the vapour, mixing with the atmospheric air, had put an end to the combustion."

Mr. Claudet's Suggestion for Diffusing Focus.—*Galignani*, on the subject, says:—It is a well-known fact that a photograph taken in the ordinary way is by no means the exact representation of the person or object, but is, on the contrary, imperfect in those parts the image of which was not at the time of the sitting in the exact focus of the lens. This is why photographers are so particular about the sitter's position, obliging him often to sit straight and stiff in his chair, to the great detriment of the artistical beauty of the photograph; because the greater the distance between the planes in which two different parts of the body or face are seen, the more want to proportion will there be in the representation of those parts. Mr. Claudet has been lately endeavouring to grapple with this difficulty in the art of photography, by starting from the principle that, in order to obtain a perfect representation of an object, each of its parts should be successively brought into the focus. If the image of the nose could be taken first, and the focus were then shifted so as to get the eyes in, then again shifted to get in the ears, and if these three images could afterwards be made into one, the portrait would be perfect. If the focussing screen be made to slide backwards or forwards till it reaches the exact spot where either the nose, eye, or ear is in the focus, the different planes of the face will each have been successively in the focus and out of it for a certain time, and the portrait will be so much the nearer to perfection. The same result may be obtained in another way. Instead of sliding the focussing screen backwards and forwards, the object-glass may be composed of two lenses, which, by being brought nearer to, or removed from, each other, will make the common focus shift its place according to the artist's desire. This operation would not in any case lengthen the sitting, and the interposition of the common diaphragm would contribute to render the compound images as clear as can be desired.

To Correspondents.

J. C.—From the appearance of the stain on the print we should conclude that the negative had been produced on a dirty plate, and that the stain would show as a metallic silver marking between the film and glass on examining the back of the plate. Such stains often show more after varnishing the negative than before. Revarnishing will, in such cases, sometimes reduce the extent of the evil. At this season of the year it is very important to have the plate perfectly clean and dry before coating with collodion.

A Subscriber.—If you had enclosed a print we could have formed a better opinion. It is possible that the granular, coarse texture of the enlarged negatives is due to the texture of the original negative or of the transparency, which, being magnified, gives the result of which you speak. If the coarseness be due to the character of the deposit of silver, reducing the amount of free nitrate on the plate before development would materially modify the result.

Wm. Sturgeon.—The lenses of your stereoscope should be 2½ inches from centre to centre, and you will doubtless obtain a better result by altering yours to this standard. Are they whole lenses or prisms? If the latter, see that they are fixed properly in position. In some of the common stereoscopes the prisms are carelessly fixed, easily slipping out of truth, and materially injuring the result.

J. H. M. K.—We know very little of the lens of which you complain; but many of the defects of which you speak, such as the hands being disproportionately large, are either the result of the lens being of too short focus, or of the heads being placed too much in advance. The slowness of the lens we cannot understand in connection with the claims for rapidity made for it. You must bear in mind that the examples enclosed prove nothing: one is produced with an exposure of fifteen seconds, the other with an exposure of thirty-five seconds; but we have no means of knowing what kind of light, or what the relation between the angular aperture of each lens. 2. We prefer those of the maker whose lens you contemplate buying, to either of those used in the pictures sent. Whether the price is cheap for a second-hand lens we cannot tell you without knowing more particulars; but we should have no doubt of its excellence. 3. A great portion of the silver added is doubtless precipitated as iodide of silver, which you may filter out and add to your residues for reduction. The nitrate of silver in solution will not be injured, but the solution will be weak, not more than half the strength necessary for a negative bath. We shall be glad to receive your experience with cyanide. The tone of the prints is very good.

M. Boak.—The photographs have been duly registered, and you may with safety issue copies. No document of acknowledgment is issued from Stationer's Hall. 2. The best mode of multiplying negatives is to take a transparency the same size, using a small stop to secure a good definition, and exposing thoroughly, and then from that another negative, using the wet process and camera printing. You will find valuable hints in our Year-Book for 1865, in Mr. Blanchard's article on Multiplying and Enlarging Negatives. We cannot, unfortunately, undertake to answer questions of this kind by private letter, as our time is too much engaged.

R. J. S.—The proportions of your room are very good. We should make all glass, except five or six feet at each end, both sides and roof; you will then be able to work with the sitter at either end of the room.

W. Moffatt.—Various varnishes have been employed for transparencies as a substitute for ground-glass; but we know of nothing better than the crystal varnish (which is gum dammar and benzole), to which a little bleached bee's-wax is added. A few grains per ounce, varying from three to ten, depending upon the amount of opacity desired, will answer the purpose.

Phlegethon.—The gun-cotton has undergone some decomposition, and trial alone will enable you to judge whether it is injured or not. Wash it in a dilute solution of ammonia to neutralize any acid; rinse thoroughly, and dry; then try a sample of collodion made with it.

S. Koore.—Any kind of frosting—blue or otherwise—will obstruct a good deal of light; the chief use of such a coating is to keep out direct sunlight when it is troublesome; the blue frosting is commonly used in America for this purpose, and is liked there; but we cannot speak from personal experience. If your curtains answer well, it is better to leave well alone. 2. The yellow or red fogging of shadows whilst intensifying may proceed from a variety of causes, which you will find fully treated at p. 361 of the Photographic News, Vol. VI., and in our Year-Book for 1863. The best remedy is to use, between the operation of developing and intensifying, a solution of iodine one grain, iodide of potassium two grains, water one ounce, of course washing between each fresh solution. After applying the iodine, the intensification will proceed more readily, and there will be little danger of fog. 3. You will find a recipe for varnish on another page of this number. Methylated spirit will answer with Mr. Lyte's formula.

N.—The principle of the diagonal movement in pouring solutions from large dishes having a general as well as a specific interest, there could be no impropriety in its appearance in some journal of a more general character, as well as in our own pages. For the present moment the MSS. is mislaid; we shall, however, examine it carefully, and ascertain if further explanation be necessary.

Meister.—Photography has so comparatively recently entered into the ranks of the regular industries, that it has scarcely yet acquired regular recognized trade rules. Each establishment is very much governed by its own customs. The hours which assistants are generally required to work are governed a good deal by the amount of day-light, and are longer in summer than in winter. Printers are often engaged longer hours than operators. The latter generally commence duties at 9 o'clock, a.m., whilst printers generally commence at 8 o'clock. The latter must generally remain until all the prints of each day's printing are toned, fixed, and washed in a few changes of water, which will sometimes engage him until 7 or 8 in summer, and until about 6 in winter; whilst the operator will rarely be engaged (except occasionally in making new baths, &c.) later than 5 or 6 o'clock. The requirements of each establishment will generally regulate such details, and it will rarely happen that a photographer's assistant is regularly engaged during ten hours of every day; but if an employer could find work during these hours, it is probable that he could, if he chose, demand service during such hours.

A Learner.—Your description of the toning bath turning brown, and refusing to tone, suggests the probable cause of the failure. It is probable that you touch the toning solution with fingers which have previously come into contact with hyposulphite of soda. The slightest trace of hypo will cause the toning bath to throw down a brown flocculent deposit, and the bath will not tone the prints beyond a brown. The slightest uncleanliness is fatal to a toning bath. The greasiness of which you speak is often the result of touching the albumenized surface with the fingers. If it be not the result of want of care and cleanliness in working, the paper is at fault; but it is more probably the manipulator. 2. Almost every process of intensifying (except that with pyro and silver) seems to have a greater or less tendency to produce a pulverulent film.

F. H. Renen.—Thanks for the cards. The prisoner's portrait illustrates a singular phase of malformation. The yellow colour of the other print is very inexplicable under the circumstances described.

A Constant Reader.—It is probable that ordinary white-wine vinegar, or even common vinegar, will answer the purpose as well.

Palette.—The head of the portrait enclosed is very good indeed.

W. W. W.—Zinc would gradually reduce the silver in your residues. It is not suitable for a vessel in which to keep the waste solutions.

Harwich.—The announcement to which you refer was communicated by a correspondent who had been visiting the town; whether the fact remains the same or not, we do not know.

W. Garthwaite.—The letter was duly forwarded. Thanks for the paragraph.

W. W. W.—The yellow spots on the print forwarded are probably due to the formation of air-bubbles on the print when immersed in the fixing bath, which cause imperfect fixation at such points.

A Constant Subscriber.—The letter has been addressed, stamped, and forwarded.

J. M. Young.—Thanks for the descriptions of apparatus, which shall receive due attention. 2. We cannot speak from personal knowledge of the lens in question. We believe it to be a good lens, but scarcely equal to covering properly a five by four plate.

H. M. (Dublin).—We have not had opportunity of learning more of the cement of pitch and gutta-percha than was given in the paragraph in our Sixth Volume; but we see no reason to doubt its value as a means of rendering cisterns, trays, &c., waterproof. The paper on the subject was read by Professor Edmund Davy, before the Royal Dublin Society. It consists of two parts by weight of crimson pitch and one of gutta-percha, melted together in an iron vessel. It may be then poured into cold water to set, and kept dry for use. We have not heard anything further of the medal in reference to which you kindly undertook to rectify the error of the committee.

J. H.—Make a ten-grain solution of cyanide, and add a few drops at a time until a distinct and permanent precipitate is formed. Shake well and filter; and if necessary, add a little nitric acid. See leader in the present number. 2. About nine feet at the eaves, and fourteen feet at the ridge, will give your studio a satisfactory height. If the studio be glazed at both sides there must always be a curtain at one side to reduce the light, and so secure shadow.

Thomas Collins.—We are not aware of the existence of any complete history of the Atlantic Telegraph enterprize. A volume by W. H. Russell was published last year, giving a history of the last expedition, and glancing at previous attempts; and the columns of the daily press contained a long account of the successful laying of the present cable a few months ago. Various magazine articles have also appeared, sketching the general history of the matter. The "Electrician" was commenced a little more than five years ago; but was discontinued after an existence of about two years. We do not know whether the volumes are in existence, nor the price. The "Scientific Review" continues to be issued monthly.

Critical Notices of Stereographs, &c., and some other articles in type, are compelled to stand over until our next.

Several Correspondents in our next.

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Photographs Registered.

Messrs. W. and D. Downey, Newcastle-on-Tyne,
One Photograph of Rev. Thos. Simpson Ullathorne.
Twenty-four Photographs of the Royal Family, &c.

Messrs. J. T. and W. Slane, Cheltenham,
Two Photographs of Launch of Life Boat.

Mr. F. Downer, Watford,
Photographic Group of Old Berkley Foxhounds.

Mr. J. Frew, North Shields,
Two Photographs of Rev. C. Reid.

Mr. A. H. Clarke, Ripon,
Photograph of Rev. Canon Attay.

Mr. J. Roberts, Draycott-in-the-Clay,
Photograph of Mr. S. Gee.

Mr. H. Penn,
Three Photographs of John Bright.

Mr. A. G. Ton, Cheltenham,
Photograph of Dr. Walker.

Mr. C. Mole, Birmingham,
Photograph of Mr. Nixon.

Mr. John Stuart, Glasgow,
Three Photographs of Dr. Henderson.

Mr. H. J. Whitlock, Birmingham,
Photograph of House, 2, New Street, Birmingham.

Winter and Son, Beverley,
Photograph of Beverley Minster.
Two Photographs of North Bar, Beverley.

Mr. J. Vaughan, Worcester,
Design for Back of Playing Cards.

Mr. M. Boak, Great Driffield,
Two Photographs of the Inauguration of the Sir Tatton Sykes Memorial.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 427.—November 9, 1866.

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PRESERVING PRINTS FROM FADING.

Amongst the various methods proposed for the prevention of fading of silver prints, too little attention has been given, we fear, to preservative measures. A perfectly fixed and perfectly washed print—one which has received the most conscientious care from the photographer—may be submitted to such conditions after it leaves his care as will ensure its speedy destruction; and the traces of fading, little or great, will generally be accredited to the photographer, however innocent he may, in many cases, be in reference to the decadence. Even in the matter of the mounting-board the photographer is never safe. Repeated as have been the cautions on this subject, as to the injurious effects of hyposulphite of soda in the board, respectable firms still at times issue boards, apparently of excellent quality, which, on testing, are found little short of saturated with hyposulphite, present, in fact, in such large proportions that we are utterly unable to account for it on any reasonable theory. It is, we know, used to remove the chlorine which is used as a bleaching agent during the manufacture of the paper; but how it can be used in such excess, and left in the paper in such proportion that an intense yellow-brown stain is produced in a moment by contact with nitrate of silver, as in the case of some cards we recently examined, we cannot understand. It suggests, however, the importance of testing each fresh stock of mounting-boards obtained by the photographer. This is easily done by digesting a few pieces of the card in warm water for a short time, and then adding a drop of a solution of nitrate of silver, the appearance of a brown turbidity indicating the presence of the hypo with sufficient accuracy for such a purpose.

The practice of some careful photographers, of waxing their prints before mounting, would serve as a considerable protection from injurious substances in the mounting-board, as well as from atmospheric injury afterwards. Mr. Thurston Thompson once informed us that he waxed every print of his own before mounting, to secure the additional transparency and delicacy conferred, as well as to preserve from moisture, &c. Waxing, or treating with encaustic paste, after mounting, doubtless also exercises a preservative effect.

We have recently had our attention called to the preservative action of varnishes on silver prints. A correspondent, Mr. Honeywood, of Horsham, sends us a plain paper print produced six years ago, which only received half-an-hour's washing; yet it is in perfect condition, with fine blacks and pure whites. Its preservation is due to immersion in a dilute solution of shellac in spirits of wine, the amount of resin left in the pores of the paper being sufficient, apparently, to exercise a preservative action without degrading the purity of the whites or giving a varnished appearance. About the same time that we received this print, we were favoured with a call by Mr. Nash, a gentleman engaged in the manufacture of varnish. He showed us a print which a year or two ago had been treated on one-half with a very pure varnish, whilst the other half was left untouched. The print was then placed in circumstances rapidly conducing to fading; the half which was left unprotected gradually assumed the offensive yellow tint so well known and little liked, whilst the varnished half retained all its pristine purity. The varnish, a sample of which he left with us for trial and future report, was, he informed us, simply a spirit shellac varnish, but it had been subjected to some decolourizing process after making, which gave it great purity and freedom from the usual brown tint.

We may here name a point of considerable importance to which Mr. Nash referred, and which had not before come under our attention. In stating his reasons for not using the ordinary white or bleached lac for such a varnish, he remarked that such a varnish, containing chlorine, was unsuitable for contact with silver prints. The bleaching of the lac is effected by means of chlorine, and he had found that on adding a drop of a solution of nitrate of silver to a varnish of white lac, a precipitate of chloride of silver was thrown down. If this be the case, varnishes made with white lac are undesirable for all photographic purposes.

One of the objections to the use of varnish to a paper photograph consists in the undesirability of increasing the gloss on the surface. In using the varnish prepared by Mr. Nash to an albumenized print, very little change in appearance is produced; but where this objection exists, it may be met in another way. A varnish made by dissolving shellac in a boiling solution of borax, or by adding a saturated solution of borax to an alcoholic solution of shellac, will preserve the print from the action of moisture without giving it a glazed surface. The "sizing preparation" manufactured by Mr. Newman will give a comparatively water-proof surface without communicating any glaze, or causing loss of transparency in the shadows or of purity in the whites. It is possible that if research were made in this direction, other agents might be found; but as we said at the outset, whilst much attention has been given to remove the inherent causes of fading, too little attention has been given to the preservation of the prints from the outward action of agency calculated to deteriorate or destroy them.

THE *ATHENÆUM* ON RETOUCHED PHOTOGRAPHS AND FINE ART.

A fortnight ago we called attention to some singular errors of an art critic, in relation to the retouching of photographs, and the basis of the claims of photography to rank as an art. Our comments were based at the time on the internal evidence of misconception in supposing that certain alleged faults in the pictures under notice were due to retouching. We were not prepared, however, for misunderstanding so complete, or misrepresentation so perverse, as we find illustrated in the real facts of the case. We thought it was probable that in the pictures described as "worked upon so entirely as to possess no more brightness than a drop-scene," some few touches of the pencil were present, suggesting to the uninformed critic that the picture really was "sophisticated;" and we stated that the probability was, that the pictures were touched because they were imperfect, rather than imperfect because they were touched. Mr. Frith has within the last few days favoured us with examples of the pictures criticised, and we now find that the pictures *are entirely untouched*! that even the slight touching out of spots, which we had supposed might have suggested to the critic the presence of handiwork, does not exist. We can conceive no motive for this singular misappreciation but a rooted incapacity to believe that any artistic thing can come out of photography.

The critic has a foregone conviction that photography is not fine art; but these photographs—we refer to some of those condemned as so thoroughly "sophisticated"—are so perfect, and approach in pictorial excellence so nearly to an artist's drawing, that he can come to no other conclusion than that they have been worked upon by an artist, and such working upon is "sophistication," which is illegitimate, and to be condemned. Such appears to be the line of argument. *Voila tout.*

"Varenna, Lago Como," one of the condemned "sophisticated" photographs, is a charming picture and an exceedingly perfect photograph.* The foreground is brilliant and well defined; the middle distance retires and takes its place most perfectly; and the distance—mountains almost merging into the clouds behind them—most tenderly and delicately rendered; the whole picture is full of atmosphere, and composes admirably. "Bonchurch, Isle of Wight," described as worked on until it is as dull as a drop-scene, is a perfectly untouched and, in many respects, a charming photograph. A little lack of brilliancy there is; but it is solely due to the photographic causes which we had conjectured—under-exposure, &c.—and in no wise to sophistication by the pencil. Some other pictures of the same series, unnoticed by the critic, are as near perfection as it is possible to be: amongst these we may mention "The Belfry, Bruges," full of the most delicate and tender rendering; perfectly defined, without hardness; with exquisite light and shade; transparent water with picturesque reflections, broken by the ripple of the water, as such reflections should be; a sky which harmonizes admirably, and completes the atmospheric effect of the whole. "The Lower Fall, Reichenbach," and a "View on the St. Gotthard Road," are nearly faultless. "St. Moritz, Engardine," a view of "Goring, on the Thames," and others of the series, demand similar praise; the especial characteristic being pictorial beauty of a kind which strongly suggests the work of the painter, rather than that simply of the photographer. It is here that our critic has been led astray. The photographer has trod so closely upon what the critic regards as the domain of art, that he has come to the conclusion that many of the qualities were due to handiwork, and not to photography in its primal simplicity. Now it does not require much argument to prove that if photography of great technical excellence produce results with pictorial qualities which suggest man's handiwork, the results being true as well as beautiful, cannot be bad art.

It is somewhat mortifying to photographers of this day—who, employing all the appliances which the advanced condition of the art places at their disposal, aim at producing worthy pictorial results—to find their work not simply treated with the same kind of criticism which the hard black and white prints of a dozen years ago were greeted, but absolutely put in unfavourable contrast with the most mechanical of their results, which are praised as "virgin photographs." Notwithstanding much misappreciation, photographers have been tempted at times to think that as the writers of such criticisms really must, from their position, understand something of art, their estimate of photography should have some value, and they have occasionally been depressed by the contempt bestowed on their work. Such an illustration as we have given, then, of the insight possessed by such writers, and of the value of their opinions, must be consolatory. We append a letter received from Mr. Frith, in which he pertinently suggests that as these gentlemen deny to photography recognition as art, it is natural that it should not be understood by art critics.

Art-Reviewers versus Photography.

Sir,—The leader in your last number, based upon certain remarks contained in a notice of my series of landscape views in the *Athenæum.* is very good. You have grasped the two obvious features of the case; viz., first, that the reviewer is utterly ignorant of the subject upon which he writes, inasmuch as pictures which he criticises as "touched," are entirely *un*touched (I wonder how *he* would like to produce an 8½ by 6½ picture, mount it handsomely, and then colour it, as he describes, for the sum of *two shillings*, with a liberal discount to the trade!); and secondly, that his adverse criticism is dictated by the old unreasoning and determined hostility to the art of photography. This is evident from the degrading terms which are employed respecting the art in general; and I am sure your convictions on this point will be confirmed by an examination of the views which the critic selects to *praise*, as compared with those which he condemns. The former, although fine specimens of their class, are the "brilliant" and *comparatively* hard pictures, with "stopped" skies, "the legitimate province of photography." No doubt its enemies would be glad to keep it down to this mark. Amongst *the latter* are certainly some of the very finest pictures I ever produced, full of delicate definition and of beautiful atmospheric effect, and with well-toned skies; in fact, so entirely realizing "fine art" that the reviewer, in his ignorance of what genuine photography *can* produce, professes not to believe that they *are* photographs!

You, sir, are an independent judge. I am personally unknown to you, and have never courted your favour. Will you please pronounce if his description of such pictures as "Varenna," "View from the Churchyard, Thun," &c., as being "dull and lifeless," and "possessing no more brightness than a drop-scene, is not as unjust and untrue as his assertion that they are touched prints?

Imagine the disgust of a man who knows something of "what's what," to have his inferior pictures "cracked up," and his latest and infinitely best efforts described so contemptuously, by the fine-art critic of one of the leading papers of the day!

How I wish that "fine-art" gentlemen would confine their attentions to what they understand, and assume to *be* fine art. By their own confession photography is out of *their* province, and will readily command public favour without their assistance; I may even venture to say, in spite of their opposition.

Another kindness which the *Athenæum* has done me is, that with my list, and a long standing advertisement in its own columns before him, the reviewer describes my series as consisting of *thirty* views, instead of 520!—Yours, very sincerely, F. Frith.

PAPIER LEPTOGRAPHIQUE.

This new form of sensitive paper, which has for some time past excited much interest in Paris, and which was recently described by our Paris Correspondent, appears to be, as we have suspected from some pretty specimens we have seen, prepared by some modification of our collodio-chloride process. M. Gaudin says, in *La Lumière*:—

Six months ago the *Moniteur* announced the invention of a new photographic paper called *papier leptographique*, which was stated to possess many important advantages over the ordinary albumenized paper at present in use; since that time photographers have been anxiously awaiting the results of any experiments which may have been conducted with a material for which such superiority had been claimed. We have made several trials with samples of the paper in question obtained direct from the office of the Company, who have established a manufactory of the new material at Paris, and purpose laying before our readers the conclusions to which we have been led.

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* Many of our readers have seen examples of this series exhibited at photographic meetings as illustrations of the working of Ross's new doublet.

The paper, which has a beautiful even surface, appears to be of excellent manufacture, and the specimens of photography which are shown as having been produced with it are certainly very perfect. The Company state that their paper is much superior to albumenized paper in respect to the prints obtained with it, in rapidity of printing, in economy, and likewise in its keeping qualities; but these pretensions are considerably diminished when the actual cost has been ascertained, and the paper practically tried in the pressure-frame.

The paper is of two qualities, glazed and unglazed; in lieu of albumen it appears to be coated with a thin film of collodion in combination with some organic substance, as when printed it assumes a reddish colour, as is always the case with a paper containing organic matter. In fact, it is probably only a modification of Mr. Wharton Simpson's collodio-chloride process, which resembled the *photogene* of which we suggested the employment on glass negatives and on paper. The great advantage possessed by this paper is doubtless the possibility of preserving it for any length of time without deterioration; and in proof of this we may state that a specimen of it, which had been a fortnight in our possession without being at all cared for, was found to be of as pure a white as when first manufactured.

This paper, therefore, unlike its predecessors. does not suffer from keeping, and it has certainly yielded good proofs of its printing qualities; but, excepting on these two points, it offers none of the advantages which have been claimed in its favour. The name it bears was given to imply the possession of greater sensitiveness as compared with albumenized paper, whereas the result of actual experiment demonstrates that the latter is quite as sensitive as the former. With regard to its cost in comparison with other papers, everybody may judge for themselves. The glazed paper of the best quality, which is equal to ordinary albumenized paper, is sold at 37 francs a quire (30s.), whereas the cost of preparing and sensitizing albumenized paper at large establishments does not exceed 15 francs (12s.) a quire. The new material is therefore two and a half times dearer than albumenized paper, a fact which renders the statement that its employment is more economical somewhat difficult of explanation.

There is no doubt that the high price charged for this material will seriously affect its sale, and amateurs, who only purchase small quantities of it at a time, would certainly object to paying a retail price amounting, perhaps, to fifty francs (£2) per quire: before, therefore, it can be generally adopted by photographers, a great reduction in its cost must be effected.

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RECOVERY OF SILVER FROM PAPER ASHES.

In a recent number we published a simple method, described by Mr. Laudy in an American contemporary, of recovering the silver from waste excited paper by burning it to ashes, and then treating the ashes with nitric acid. Our esteemed *collaborateur*, Mr. Spiller, put the proposed method to the test, and found it even more efficient, and yielding a larger amount of silver, than he had anticipated. Another correspondent of our American contemporary, whom, for the purpose of more fully discussing the matter, we quoted in our last, threw considerable doubt upon the value of the method suggested, and gave a somewhat astounding analysis of the ashes obtained from burning excited paper. We now append Mr. Spiller's remarks upon this analysis, and simply add the remark, that this gentleman's name is a guarantee for ability and accuracy, whilst the facilities afforded for such analysis by his position and duties in the Chemical Department of the Royal Arsenal give the highest value to all his experiments in this direction. We thus call attention to the matter because the process is so simple that it is of considerable importance that its efficiency should be substantiated on the best authority. Mr. Spiller says:—

"My dear Sir,—Since you have appended my name to the remarks presented to your readers last week (p. 523), from 'A Correspondent of *Humphrey's Journal*,' I cannot refrain from expressing my opinion of the untrustworthy character of the American 'Analysis of the ashes of paper sensitized in a 60-grain bath,' quoted in your columns.

"It is impossible to conceive the existence of twenty per cent. of 'organic compounds of silver' in a burnt product, and almost as difficult to believe in the 'oxide of silver' stated among the constituents. The amount of chloride (17 per cent.) is, from my experience, considerably over-estimated; whilst no account is taken of the presence of sulphur, which I found in appreciable quantity. It is scarcely worth while pointing out the absurdity involved in the expression, '100 parts of ashes contain, besides the silver compounds enumerated, 24·63 parts of ashes.'

"The same authority quotes the loss of silver by the adoption of the nitric process at thirty-eight per cent. or more, whilst I should be inclined to estimate it at eight per cent. at the most.—I am, dear Sir, yours, &c.,

"John Spiller.

"*Woolwich, Nov. 5th.*"

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Critical Notices.

STEREOGRAPHS OF CANTERBURY CATHEDRAL.

By Frank M. Good.

In producing a series of stereographs of a place like Canterbury Cathedral, it might at first sight readily be supposed that little remained for the photographer to achieve beyond completeness, by securing every possible view of interest and excellence, in the form of good technical photography. Mr. Good has secured both these; but on a careful examination, we find that he has secured something more: he has evidently proceeded about his work with a loving appreciation of its beauties, and has aimed, by careful attention to effects of light and shade, by choice of position and selection of parts, to form a picture, and, by in many instances exquisite rendering of texture, to convey in his series as perfect an impression as possible of one of the finest examples of Christian architecture we have in this country

In a series characterized by great uniformity of excellence it is difficult to select especial examples of skilful treatment; but we may mention one or two. Difficult to obtain, but in this instance most successfully secured, is a general view of the Cathedral from the south-west; the roofs of houses intervening in front are eyesores beyond the power of the photographer to remove; but the general view of the pile is satisfactorily secured, and a fine natural sky with clouds forms an admirable and effective background for the noble building. The Crypt—another difficult subject—is here most effective, and forms a fine picture. St. Michael's Chapel deserves similar praise. The series, as a whole, are excellent photographs, and will be valued by the archæologist for the carefully-detailed rendering of the portions which present fine examples of the progressive periods illustrated in this Cathedral

STEREOGRAPHS. By G. W. Wilson, Aberdeen.

We always anticipate with interest and pleasure the examination of examples of the photography of Mr. Wilson, of Aberdeen, and in the case of the pictures before us realization has fully equalled anticipation. Yet anything in the form of criticism or comment must be summed up in a few words: we cannot give higher praise than to say that in the pictures before us Mr. Wilson is equal to himself.

We have examples of three distinct classes of pictures:—Pure landscape; architecture, interiors and exteriors; and instantaneous street views. Some of the latter, by far the most difficult work, are exceedingly good. "Princes Street, Edinburgh," gives us a view of that fine promenade with some scores of well-defined figures, many of whom are evidently hurrying on with the quick step that indicates a man bent on business. In the "Cross and Town-house, Carlisle," the loitering groups in the market-place present fewer difficulties, but help to form a capital picture.

Amongst the architectural pictures, Balmoral Castle forms a prominent subject, some seven or eight different views lying before us, some of which are examples of the perfection of technical photography, and of as much pictorial excellence as can be obtained from somewhat unpromising materials. Several fine views of Durham Cathedral have great pictorial value. The Choir, Carlisle Cathedral, gives a capital rendering of one of the largest and finest decorated windows in existence. The landscapes, chiefly consisting of Highland scenery, are all good, most of them having the crowning charm of natural skies instead of a patch of white paper.

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CARBON PRINTING.—No. 3.

Working with Swan's Tissue.

BY NELSON K. CHERRILL.*

Since writing my last, I have been making a series of experiments to determine the best strength of bichromate solution for use. I was led to this by having one day experienced a slight failure with some tissue which Mr. Swan sent me down, which was much thinner than that with which my early experiments had been carried on. This thin tissue I found liable to become quite rough on drying after an immersion in a saturated solution of the sensitizing salt; this roughness I found to be owing to a sort of crystallization in the gelatine film, and, to avoid it, I was led to use a weaker solution of bichromate in place of a shorter immersion of the tissue in the saturated solution before used.

In the course of my experiments, I was led to observe that a quantity of the bichromate salt placed in a bottle full of water, and left undisturbed even for many days, failed to give a really saturated solution of the salt; this was owing to the slowness with which the crystals dissolve, and to the density of the solution which formed the lower layer in the water interfering with the regular distribution of the salt in the liquid. By using hot water in the formation of the saturated solution, I found the specific gravity to be 1·062; but the solution of this density, when set aside for some days, deposited crystals to such an extent as to reduce its specific gravity to 1·055. I am now using a solution of only 1·017 or 1·015 in the preparation of the tissue, and I find that the thin sample before spoken of works quite as well on the weak solution as the thick tissue did on a stronger. As a rule, three minutes in sunshine will suffice for a good negative; but in the shade. from twenty to thirty minutes will be required.

I have not as yet made sufficient experiments to determine how many sheets of tissue may be prepared in a given quantity of bichromate solution; but for the benefit of those who may be in doubt as to this point, I may give the result of a careful experiment which has proved quite successful.

Two pints of a solution of bichromate of potass, of sp. gr. 1·015, were used at a temperature of 50° Fah., to sensitize five sheets of tissue 17 by 22 inches. During the operation nearly one pint of the solution was taken up, and the remaining quantity was found raised to a temperature of 55° Fah., having, at the same time, increased in specific gravity to 1·02. All the five sheets of tissue were found perfect in every respect, and though the solution remaining in the dish was thrown away at this point, it might have been used to some further extent. It is evident that the increase which is manifested in its specific gravity was owing to its having dissolved some of the organic matter from the gelatine coating of the tissue. I have been trying, also, some experiments to find the range of exposure above and below that required to produce a perfect result, in water of a certain temperature, which will give a good result, by varying the conditions of development. I find 100° Fah. the lowest at which the prints develop satisfactorily; and I also think that it is, for many reasons, best to work with the developing bath at as low a temperature as possible. The under-exposure which is necessary to produce good results in water of this degree renders it, perhaps, rather more difficult to hit the exact time in the frame without the use of an actinometer; so that, as a rule, I use the bath at 120°, which allows a little latitude either way.

The difficulty of using very hot water in the development is, that it has a great tendency to form blisters in the film. I have not found these occur under 140°, but at 160° or 170° they are very common. I have many experiments in progress to determine this point with accuracy. It seems to me very important to know with certainty the increase of temperature in the developing-bath which will correspond with various amounts of over-exposure in the tissue.

I have just tried a method of work which seems to me to be likely to effect some saving in the practical working of the process.

Instead of mounting each piece of tissue on a separate sheet of paper, I mount one piece of tissue on a sheet of Saxe paper, and then mount a series of other pieces of tissue on the back of the first. To do this, it is merely necessary to brush both *back* and *front* of the exposed tissue with India-rubber, and also to prepare in the same way one piece of plain paper. When dry, they are placed in a little pile, the face of one sheet of tissue being brought into contact with the back of the next, and so on. The whole are then passed through the rolling-machine, and developed. When the topmost covering paper is removed, the picture will be seen on the upper surface of the covering paper of the second picture, and long before it is developed it may be removed. The second picture will then be seen on the top of the third paper, and this also may be removed; and so on until the last, which will be, of course, mounted on the plain Saxe paper.

I received the other day from Mr. Swan a very interesting letter, in which he details to me the reasons for which he was led to adopt the use of the powdered French chalk. It seems that if the limp tissue is pressed against the negative, it is very liable to cockle up in places. This is owing to the peculiar constitution of its surface, which renders the slightest "play" upon the glass impossible. The pressure, therefore, instead of pressing the tissue into close contact with the negative, only served to make it touch in a number of points divided from each other by patches of irregular dimensions, which were not in contact with the glass. The very thin film of powdered French chalk, by "*preventing absolute contact*," was found to overcome the difficulty, and to render the use of the ordinary printing-frame as efficient for carbon tissue as it is in the case of albumenized paper. The fact that the French chalk will not "rub" over tissue that is too damp for use, also serves as a guide for the right condition of the film.

(*To be continued.*)

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* Continued from p. 484.

YORKSHIRE FINE ART AND INDUSTRIAL EXHIBITION.

A correspondent sends us the following:—

The closing ceremony of the Yorkshire Fine Art and Industrial Exhibition took place on Friday last, presided over by the Lord Mayor of York, and was followed by an evening dress conversazione, attended by about 2,700 of the gentry and citizens of York. This exhibition has been a most brilliant success, and notwithstanding certain captious criticisms, the vast numbers who have attended prove how popular it has been; nearly 400,000 visits have been paid to it; the last day there was a larger number than on any previous one, viz., 12,650.

One characteristic of this exhibition has been the completeness of its arrangements, and the provision made to meet the tastes of all visitors. The leading feature of the exhibition was, undoubtedly, its picture galleries; whilst, in addition, the machinery and the natural and industrial products provided for the pleasure and instruction of multitudes who might not be able to appreciate the beauties of pictorial art. The financial result is also most gratifying; the surplus likely to remain, notwithstanding the large expense of erecting a building specially for the exhibition, is considerably over £3,000.

The report of the Executive, presented at the closing ceremony, included the awards of medals and certificates of merit. The following were those relating to photography:—

Bedford, F., Camden Road, London—Medal, for great excellence in landscape photography.

Gowland, W. T. and R., York—Medal, for excellence in plain and coloured photographic portraits.

Holroyd, T. and J., Harrogate—Medal, for the excellence of their enlarged photographic portraits.

Monkhouse, W., York—Medal, for excellence in photographs of interiors; and certificate, for the ingenuity of construction and the efficiency of his "water agitator," for washing photographic prints.

Glaisby, W. P., York—Certificate, for excellence in photographs of interiors.

Gregson, E., Halifax—Certificate, for the excellence of his photographs of machinery.

Holder, W. H., Scarbro'—Certificate, for his coloured photographic enlargements.

Jackson, Bros., Oldham—Certificate, for excellence in landscape photography.

Newell and Son, York—Certificate, for enlarged photographic portraits.

Sarony, O., Scarbro'—Certificate, for artistic merit in plain photographic portraits.

Swan, H., Charing Cross, London—Certificate, for new instrument for showing photographs in relief.

Walker, E. C., Liverpool—Certificate, for excellence in photographic portraits on enamelled glass.

Recent Patents.

OXYHYDROGEN-MAGNESIAN LIGHT.

BY PROSPERO CARLEVARIS.

The object of this invention is to employ a salt of magnesium, in place of lime, in the oxyhydrogen light, whereby it is stated that an intense pure light, pre-eminently suitable for photography, is obtained. The specification is as follows:—

The process whereby this light can be obtained is founded upon the following scientific principles:—

1. The infusibility of oxide of magnesium at the very highest temperature.

2. The property that the said oxide has of being volatilized, but in the smallest quantity, at a very high temperature, so that it can stand and keep for a long while, even in a flame of oxygen and hydrogen mixed together, and without imparting any colour to that flame.

3. The property that the same oxide has of spreading, on being placed within the flame of the said combination of oxygen and hydrogen gases, an intense, bright, and constant light, and which is admirably suited to nocturnal photography, to lighthouses, and general illumination.

4. The property that the spongy oxide of magnesium has of being the best of all magnesium oxides to produce the oxy-hydro-magnesian light. Spongy oxide of magnesium is prepared by exposing at such high temperature as is produced by burning together oxygen and hydrogen gases, many magnesian salts, and particularly chloride of magnesium and carbonate of magnesia, which, on being decomposed at such high temperatures, turn into spongy oxide of magnesium.

Starting from these principles to obtain the light spoken of, the process is as follows:—A piece of chloride of magnesium (same chloride of magnesium that melts into metallic magnesium), larger or smaller, according to the effects of light required, is placed either upon a small prism of gas-retort coal, or of refractory clay, or else is placed between two small platinum wires; and upon such a piece, through a small tube purposely made, the flame of the oxy-hydrogen gas (the mixture of oxygen and hydrogen) is directed. Larger or smaller pieces, like prisms or cylinders, can also be cut out of well-compressed carbonate of magnesia, and then placed to the same effect within the flame from the said oxy-hydrogen gas. The chloride of magnesium or the carbonate of magnesia, at such high temperatures as are produced by burning together oxygen and hydrogen gases, are directly decomposed and resolved into spongy oxide of magnesium, from which the intense, bright, fixed, and constant light comes forth, causing all the chemical phenomena of diffused sunlight. It is not required that the hydrogen and oxygen should be chemically pure; carburetted hydrogen or common lighting gas can be used instead of pure hydrogen. Atmospherical air, pure or mixed with $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{10}$, of its own volume of oxygen, can also be used instead of pure oxygen. The two gases, let them be pure, or ordinary lighting gas, and atmospherical air, containing more or less oxygen, must come from two different gas-holders, through two separate pipes, and must be mixed only at the end of these pipes in a very small tube, forming in that manner a real chalumeau (oxy-hydrogen soldering pipe, or pipe to burn oxygen and hydrogen together). Oxygen, to be mixed or not with atmospherical air, must be prepared according to the most recent and economical methods that are more suitable to the very country where the new process of illumination is to be adopted. The invention therefore consists in producing a light by placing the oxide of spongy magnesium in a flame produced by a mixture of oxygen and hydrogen.

DISSOLVING STERESOCOPIC VIEWS.

BY ISHAM BAGGS.

The following invention received provisional protection only. Its object was to produce an effect of dissolving views with the stereoscope.

This invention consists of certain improvements in the construction of apparatus for operating by the reflection, refraction, and transmission of light in such manner as to cause two or more stereoscopic views, pictures, or objects to appear to meet the eye from the same direction, and capable of dissolving one into the other, or of being caused to appear or disappear at pleasure either slowly or quickly.

A simple form of the apparatus for producing these effects consists of a square piece of plain plate glass, the same being placed at such an angle, relative to two stereoscopic pictures contained in the instrument, that, whenever required, one of the pictures is seen by the direct transmission of the rays of light therefrom through the substance of the glass, the other picture being seen by reflection from the surface of the same glass. By shutting out the light from either picture, and illuminating the other, the first is caused to disappear or dissolve, and the other to take its place in the organ of vision. Two or more mirrors, or other reflecting surfaces, may be used in place of one for producing these effects, upon the well-known principle of the camera lucida. Lenses may also be employed in a similar way to cast the stereoscopic pictures upon a screen or other surface, or in the air, so as to form dissolving stereoscopic pictures; and to render the effects more striking, the same may be magnified on the principle of the telescope or microscope, as well understood.

PRINTING PHOTO-RELIEVO PHOTOGRAPHS WITH WHITE MARGINS.

BY WALTER B. WOODBURY AND GEORGE DAVIES.

The object of the invention is to produce photo-relievo prints with clear margins, so as to dispense with the necessity of mounting. This, it will be seen, can be effected in various ways.

This invention is designed for the purpose of producing a clear white margin, with a sharply-defined edge, of any desired form, upon impressions (in gelatine, or other soluble semi-transparent ink or composition) obtained from metallic plates, produced by the aid of photography, either according to an invention for which the said Walter Bentley Woodbury obtained Letters Patent, dated 23rd September, 1864, No. 2338, or in any other analogous manner, the principal object of producing such white margin being for the purpose of dispensing with the necessity for cutting out and mounting such impressions upon a separate sheet of paper.

The invention consists, firstly, in cutting or scraping off the superfluous composition (gelatine and colour) round the edges of the impression, by means of four cutters or scrapers, arranged in a rectangular form, in such a manner that the area thereby enclosed can be diminished or increased at pleasure. These cutters or scrapers are mounted in a frame and connected together by levers and cranks (or their equivalents) in such a manner that one motion of a handle or lever throws all the cutters, or scrapers, outwards simultaneously. The apparatus (after being adjusted to the size and form required) is laid upon the fresh impression whilst the gelatine is moist, and one motion of the lever or handle causes the cutters, or scrapers, to lift up and remove the superfluous composition round the edges of the impression, and thus produce a clear, white margin.

The invention consists, secondly, in protecting that part of the impression which is to form the picture, and then washing off the composition from the edges or margin with warm water. The protecting of the picture whilst the margin is being washed off may be effected in a variety of ways; for instance, the impression being laid on a slab with an indian-rubber or other elastic surface, a frame or plate of metal or glass, the size and form of the desired picture, may be laid over the impression and held firmly thereon by means of a spring, weight, or other pressure, whilst the margin is washed off with warm water by means of a soft brush or sponge; or if an open frame, with an aperture of the size and form of the desired picture, be laid over the impression and secured as above named, a solution of alum (or any other well-known chemical agent which has the property of rendering gelatine insoluble) may be poured therein; and, after having been allowed to remain a sufficient time to produce that effect, the solution is to be poured off, the frame removed, and the impression dried; the marginal portion, which has not been acted upon by the chemical agent, may then be washed off with warm water; or an open frame or "mat" being placed over the impression, the central portion may be brushed over or otherwise coated with a solution of india-rubber in benzole, or with some other quickly drying varnish or solution which will render the gelatine impervious to warm water.

Another way of producing pictures with clear margins is to take the original impression upon glass prepared with a surface of wax, or some other material from which it can be easily removed when dry, and after scraping off, or otherwise removing the margin, press a sheet of paper, previously coated with adhesive cement, on to the impression, which will adhere to the paper, and may then be removed from the glass.

Our invention consists, thirdly, in the construction and use of a press, whereby the impression may be taken on paper direct with a clear margin, so as to dispense with the necessity for scraping or washing off the margin. To the interior of the lid of the press is hinged a "frisket," carrying an open, shallow-dished frame, of the exact form and size of the picture required, and the mould is to be trimmed at the edges to the same form, but rather smaller in size. When the lid of the frame is opened, the sheet of paper is laid thereon and the "frisket" closed, so that the edge of the shallow-dished frame shall press closely on the paper; the lid of the press is then closed and the impression taken, when it will be found that as the superfluous gelatine is squeezed out at the edges, instead of spreading over the margin of the paper, it will be arrested by the edge of the dished frame, and will pass down between it and the edge of the metal or other mould.

It will be obvious that by either of these methods several subjects (or repetitions of the same subject) may be printed at one time on the same sheet of paper, which may thus contain several designs on one sheet; or it may be cut into several smaller sheets, each having one impression with a clear margin all round.

PHOTOGRAPHIC PORTRAITURE.*

In the majority of the modes of multiplying the images drawn by sunlight, it is probable that portraiture will ever be the most popular application. The possession of a similitude of that which it loves, admires, or honours, seems to be a passion almost amounting to a necessity of the human mind. The portrait seems to recreate the past, to restore the absent, and to give enduring being to things which pass away. Cowper's burst of fervid affection in addressing his mother's portrait aptly embodies the feeling of every one in gazing on the likeness of a departed friend. Goethe, when he speaks of the strange, sweet way in which we seem to talk to an absent friend when we look at his picture, tells a tale echoed in the lowliest cottage as well as in the palace. Photography could not fail, then, to be a popular art in supplying a want which the human heart has always felt. But the recent developments of this phase of the art have almost amounted to the creation of a new passion, or a new want. Photography in its ordinary phases had stimulated the demand for portraiture, and brought into existence a new class of portraitists, who were rapidly superseding the old-fashioned race of miniature painters of the Miss La Creevy school, whose pink and white faces with blue shadows, large eyes, and small mouths, had no chance against the realistic but less pretty likeness produced by the camera. But although for many years photographic portraiture was in demand, it was not a rage. Little more than half a dozen years ago, a Parisian photographer conceived the idea of issuing a new style of picture, which he designated cartes de visite. The idea took, although the pictures were never employed for the purpose indicated by the name which distinguished them. But whilst no one was guilty of the vulgarity of leaving a portrait as a visiting card, everybody sat for a picture in the new style, and a system of portrait exchange and portrait collection was initiated which has no precedent in pictorial art, and the statistics of which seem almost fabulous.

A variety of causes contributed to the popularity of this new phase of portraiture, besides its appeal to the latent love of pictures and persons. There was a completeness in the portrayal which had not before been usual; the man and his dress, or, more important still, the woman and her dress, were depicted. The small proportions in which these were rendered, with a precision which secured complete identity, relieved them of much of the harshness which the uncompromising fidelity of the camera appeared to give to larger pictures, in which every freckle, scar, and wrinkle was rendered in black and white, without the redeeming aid of colour. Albums for the reception of these pictures were provided, and these, once obtained, must be filled, first with family and friends, and then with popular favourites; and the photographic album containing the domestic portrait gallery soon became a necessary adjunct of every drawing-room table. Royalty did not disdain to countenance and contribute to the popular fashion, and familiar portraits, not only of the reigning sovereign, but of every member of the royal family, down to the latest baby, became common in the home of every subject. At first these picture galleries indicated the predilections, tastes, and prejudices of the collector, and the especial bent of his hero-worship was apparent in the selection of the portraits. But soon the rage assumed a more catholic form, and universal iconolatry seemed to prevail. Cobden and Palmerston, Disraeli and

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Bright, Gladstone and Derby, Louis Napoleon and Garibaldi, Colenso and the Bishop of Oxford, Father Newman and Dr. Cumming, Archbishop Manning and Mr. Binney, may be found in the same album, without impeaching the orthodoxy in divinity, or indicating the bias in politics, of the collector. Neither can any disrespect to the divine be argued if he is associated as near neighbour to a dramatist or popular singer, or the implied greatness of the statesman be called in question, if his *vis-à-vis* be the Chinese giant Chang, or General Tom Thumb. The publishers of this class of portraits could furnish some singular statistics of popularity, curious enough in their way. A popular singer or actor, or a successful prize-fighter, will sometimes have a run entering into tens of thousands of copies; but the demand will suddenly collapse, and their names will be heard no more. Public men, whose names are distinguished in connection with the pulpit, with literature, science, or art, or in the legislature, are in constant demand, notwithstanding that the especial rage of this collection of portraits has, within the last twelve months, considerably subsided. Royal portraiture is always popular, and perhaps nothing can more strikingly illustrate the loyalty of Englishmen than the constant demand for portraits of members of the reigning family. Just about the period of the marriage of the Prince of Wales, a photographer in Brussels had the good fortune to obtain sittings from the Queen and several members of the Royal Family, including the Prince of Wales and the Princess Alexandra, and the sale of these portraits exceeded two millions of copies. One photographer alone in this country has, during the last few years, issued upwards of half a million yearly of members of the Royal Family. After the Royal Family, popular statesmen are the greatest favourites. Lord Palmerston, during his life and for some little time after his death, being in greatest demand. If the sale of men's portraits afford any indication of the popularity of their principles, it is tolerably manifest that liberalism obtains very strongly in this country, the circulation of the portraits being in the ratio of ten of Gladstone to one of Derby, who is, however, judged by this standard, the most popular of the conservatives. On the other hand, the portraits of Louis Napoleon and Garibaldi have about an equal popularity, the rage for the portraits of the latter being more spasmodic, and of the former more steady. After statesmen, popular literary men and clergymen are most in demand; and after these, men of science and artists; and lastly, popular actors and singers. Bishops seem to circulate in virtue of their rank, the Archbishop of Canterbury having the most extended circulation, whilst clergymen and ministers are prized only in virtue of their popularity. Mr. Spurgeon was for a time in very large circulation; Mr. Binney less extensively, but more constantly.

Of public portraits alone, it is certain that within the last few years the issue has amounted to several millions, the issue by one publishing firm having reached half a million a year, whilst the private portraits, circulated in family and friendly circles only, have been distributed in still greater numbers. During some years, whilst the card mania was at its height, it was not an uncommon thing for photographers who devoted themselves solely to private practice, without any view to publication, to issue ten thousand copies annually, making an aggregate of many millions of portraits issued in family circles only.

Other forms of photographic portraiture have recently shared with the carte de visite a portion of the popular favour. "Diamond Cameos," in which four small medallions, representing four different views of the face, punched into convexity to give a semblance of relief, have claimed attention. Cabinet portraits, which resemble the carte in form and details, but in larger dimensions, are rapidly gaining popularity. Amplified portraits, some of the size of life, produced from small negatives by the solar camera, an apparatus by which all the details of the small portrait are magnified without the optical inconveniences which would result from the attempt to take pictures of such large size direct, have of late years begun to attract public attention. On the phenomena of binocular vision, and its illustration by the stereoscope and photography; on the attempts to produce sculpture by the aid of a series of portraits taken all round the sitter, the outlines of which were subsequently traced by a pentagraph, one arm of which, by successive incisions, cut out the figure from a mass of modelling clay; and many other familiar and unfamiliar pictorial applications, we must refrain from extended comment.

The claim of photography to rank as a fine art has been, especially in relation to portraiture, hotly contested of late years. On the first discovery of such a method of delineation, its beauty received high recognition from the first authorities, and we find Paul Delaroche affirming its high art excellence; and we further find, that the first President of the Photographic Society was also President of the Royal Academy. Later, it has become customary amongst many artists to decry photography as a soulless, mechanical method of delineation, and its results as vulgar and despicable. The fact that photography displaces and supersedes a large number of those who have hitherto claimed the sole immunities attaching to the name of artist, renders it not unnatural that its claims should be regarded with jealous distrust; and the fact that its facile arms have been opened to many whose vile productions have tainted its reputation, has furnished a ready argument to those who would dispute its capability and position. In regard to portraiture, however, the case is tolerably clear. The painter is not a mere imitative machine; he endows his work with a certain character. The fact that Titian or Vandyke always made gentlemen of his sitters—that Kneller and Lely invested the most common-place damsels with a meretricious charm—that Reynolds and Gainsborough each lent his own specific grace to the portraits he painted, need not be disputed. It is said they painted a soul as well as a face; but it may be fairly doubted whether that soul was of that of the sitter or the painter. If the artist simply reproduce the expression he sees, he does exactly what photography does. If he paint the expression which he conceives to be characteristic of his sitter, he paints a conception of his own, which, whatever it may add of force, beauty, or pictorial value, does not add to the literal truth of the resemblance. When Boswell asked of Johnson whether he preferred "fine portraits or those of which the merit is resemblance," he received the unhesitating response, "that their chief excellence is in being like." A doctrine has been long held, however, which, as commonly stated, cannot be fairly gainsaid, that a portrait should represent the sitter at his best. [illegible] Paul Richter has remarked that it should be such a [illegible]petuation of the best self that it might induce the original, whenever he looked upon it, to avoid being more grovelling or base than his pictured resemblance. Mankind readily accept the doctrine, and, by common consent, it is regarded as a painter's duty to give dignity and grace to his portraits. A matter-of-fact portrait is almost an affront. When Humboldt, the diplomatist, who refused to sit to Isabey, afterwards saw his portrait in the picture of the Congress of Vienna, he exclaimed, "I determined to pay nothing for my portrait, and the rogue of a painter has taken his revenge by making it like." This notion of painting a man at his best, and representing the inner life and character, and not merely a map of his face, is really more specious than strictly true; or, at least, such truth as it contains is often used to give currency to much that is fallacious. The inner life and character may be suggested; the "mind, the music breathing o'er the face," may be embodied in a painting; but when this is attempted by altering in the slightest degree the features, a false and conventional, however pleasing, portrait must be the result. Many painters have certain tricks of their own whereby they conceive they add to the beauty of the countenance. Sir Thomas Lawrence, for instance, gives a special curve of the eye-brow to all his sitters; and society admires these prettinesses. But it is easy to bring the matter to a stern test: is it not tolerably certain that we should prefer to see a good photograph of Shakspeare or Milton, of Luther, or John Knox, or Oliver Cromwell, than all the paintings in which the artist gave us *his* notion of the best self of his sitter? Of Cromwell we have, probably, one of the best of existing historical portraits; his stern injunction, "Paint me as I am, warts and wrinkles as well," checked, doubtless, the softening touches of the artist; and Samuel Cooper's head of Cromwell is a portrait to study.

The fact is, that a good photograph has a truth of its own, rarely belonging to the highest efforts of the limner; and the term has become idiomatic in our language, that a truthful transcript of a thing is "photographic" in its resemblance. A good photograph often possesses a subtlety of resemblance which brings out characteristics of race or mental capacity scarcely seen in the original, but which, undoubtedly, exist. Unexpected family likeness is at times suddenly revealed in the photograph in a startling degree. Nathaniel Hawthorne has illustrated this very skilfully in his romance of the "House with the Seven Gables," and expressed his conviction that "there is a wonderful insight in heaven's broad and simple sunshine. While we give it credit for only depicting the merest surface, it actually brings out the secret character with a truth no painter would ever venture upon, even could he detect it." The painter, it is true, possesses facilities not always within the reach of the photographer: his work extends over many hours or days, during which he may perchance get glimpses of a higher or better expression than that presented to the camera in the few seconds in which its work is accomplished—an accident in nowise to be debited against photography, as it would have rendered that expression if it had been presented to it. That photography is responsible for some sad travesties of the human face divine, is an argument of little weight. We do not estimate the character of the apostles by that of Judas Iscariot.

TESTING COLLODION.

BY M. CAREY LEA.*

A correspondent of the Photographic News, Mr. Henderson, remarks, that in the early stages of photography, when photographers made their own collodion, he always tested his by focussing the bits of glass belonging to a kaleidoscope, the amount of impression which he obtained from the non-actinic colours determining the amount of sensitiveness of his collodion.

This reminds me of a contrivance which I made use of some time since for comparing collodions, the remains of which are still about my work-room, and which I will presently describe. But I do not think that the amount of impression obtained fron a non-actinic colour is in itself a true measure of the delicacy of collodion; that, I think, is to be measured rather by the amount of contrast which the collodion will give between two or more non-actinic colours, for precisely upon this depends its capacity to give the much-desired quality of transparency of shadow, which is nothing else than preserving the grades or relations of force between sets of feeble impressions.

My test was expressly framed to fix this point, and was managed as follows: I took a large sheet of paper of a moderately non-actinic colour (pale medium buff). I then took other still more non-actinic colours (dark reds, dark greens, browns, &c.), and cut them into figures, with projecting arms, such as stars and crosses. These were attached over the buff paper, and their arms were made to cross each other, so that as many different shades should be in juxtaposition as possible. This sheet was then photographed; and the various shades obtained with different collodions gave interesting information as to the qualities which they possessed.

But this alone could not be taken as affording full means of judging, for it was necessary that a collodion, to be really good, should discriminate also in the relative force of the bright lights.

To fix this, also, another sheet was prepared, this time of white paper, with various other shades of white, such as creams, bluish, paper with a faint yellow tinge by age, &c., which were made to contrast faintly with the ground and with each other.

This sheet was taken simultaneously with the non-actinic colours, and the examination of the general result furnished a criterion which, I suppose, may be taken as being as nearly correct as any that could be instituted.

If I were now to repeat the experiment, I should content myself with forming a sort of checker-board, as follows: Take a sheet of buff paper, eighteen inches square; prepare strips of red, brown, green, &c., about three inches wide, and attach them so as to form checkers, showing squares of the ground colour between them. An actinic and a non-actinic checker-board of this sort, placed upon a convenient piece of wood, would form an excellent object for testing collodions with.

A very simple and excellent test for deciding whether a collodion is sensitive to slight differences of shade in non-actinic colour I found to be as follows: Take a sheet of buff paper (the laid sort, that is, showing the meshes of the wire-cloth on which it is made), set it up, and reduce it to one-hundredth, that is, one-tenth linear dimension. With a good collodion, the parallel lines of the water-mark should be visible to the eye at once. I do not give this as a severe criterion; any good collodion will accomplish that much. The sun should fall square on the paper; if inclined, the marks show more easily, especially if the paper be so fixed that they run vertically.

DURABILITY OF ALBUMEN, AND OF DEVELOPED PRINTS.

BY M. CAREY LEA.*

I have made a long and minute examination of the resisting powers of albumen prints to the destructive effects of oxidizing agencies. I attach more importance to oxidizing agencies of destruction than to reducing ones, for the reason that they are those most generally at work in atmospheric effect, and also because this general rule seems to be correctly applicable to silver prints. This, I think, is a fair inference from the fact that prints hung up in the light keep better than those shut up in albums and portfolios. The specific agency of light, especially upon silver compounds, is a reducing one. The preservative effect of an exposure to light would seem to act by counteracting the oxidizing tendencies of the atmosphere.

It is certainly true that the air has, as a general thing, little tendency to oxidize silver; but ozone has. To the minute portions of ozone disseminated in the atmosphere must, I think, be attributed whatever powers of oxidation that atmosphere is capable of exhibiting towards silver and silver prints.

If this view of the case be correct, ozone is itself the most important of oxidizing influences which should be examined in its relation to prints, and accordingly it has received a large share in the present investigation.

For a second subject of comparison, I selected nitric acid in very dilute form. Whatever injury was suffered by it seemed no very unfair criterion as to their general permanence, because it not only measured their resistance to oxidation, but also the stability of the form in which the metals were present, and, perhaps, the relative preponderance of the gold over the silver.

I have now before me 136 registered specimens, and which, I think, enable me to speak with some certainty so far as my investigation went. I do not doubt, however, that the examination might be advantageously extended to the other destructive agencies which beset our photographic productions.

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* *Philadelphia Photographer.*

* *Philadelphia Photographer.*

In some respects, these trials gave results very unexpected to me, and quite contrary to received opinions. I refer especially to the fact, that they seemed to indicate a greater permanency for prints toned in a toning and fixing bath of hyposulphite and gold than for those in which the toning and fixing was done separately. I am not prepared to assume the position of an advocate of this method. Fine tones are obtained with it, but with much less certainty than with the newer tonings. It is to be remembered that the specimens examined by me were toned and fixed in a fresh bath in perfectly good order, and are to be taken as relating solely to such. When the use of such a bath is continued too long, the gold becomes exhausted, the hyposulphite decomposed, and the bath degenerated into a mere sulphur toner, owing its activity to the presence of tetrathionate of soda. The utter instability of such toning is well known, and is strongly exemplified in the following experiments.

Another point which these experiments bring prominently forward is the extreme weakness of developed prints. These prints have usually been thought to be exceptionally strong. It has been often affirmed that they contain much more metal than sun prints, and resist decomposing agencies far more effectually. In the interval, since I became, by these experiments, convinced of the contrary, I observe that Mr. Sutton, one of the most enthusiastic advocates of the development printing, has frankly abandoned his former views, and acknowledged his error. This result is perfectly in harmony with the conclusions that I had already come to, and here publish, much later than I intended, for want of time to sooner write them out.

Series 1.

In this series five tonings were experimented upon :—

A. Washed after printing; then toned with benzoate of gold; then fixed in hypo, and washed.

B. Same, except that the citric acid toning bath was used.

C. Tetrathionate toning; hyposulphite of soda treated with chloride of lead.

D. Hyposulphite and gold toning.

E. *C* and *D* mixed.

To render the effects of the after treatment more conspicuous, the printing was very lightly done. The print was cut up, and portions were carefully toned in each of the above baths. Then these portions, all carefully registered, were cut up, and a portion of each subjected to each of the following treatments :—

1. Exposed dry to the action of ozone, under a bell-glass, for forty hours.
2. Exposed to the same treatment, wet.
3. Exposed to the action of nitric acid, sp. gr. 1.28, diluted to 1-25 with water, for seventeen hours.
4. Same, for thirty hours.
5. Same, for one hundred hours.

These twenty-five results were then carefully compared, as follows :—

a. The action of the ozone was in every case more powerful on the dry papers than the wet.

b. After the print had been exposed to the nitric solution for seventeen hours, little further result followed in the following thirteen; but when the time was extended to one hundred hours, the original effect was about doubled.

c. Of *A* (benzoate), *B* (citrate), and *D* (hypo and gold) tonings, the latter, in place of being the weaker, resisted a little the best.

d. *C*, the sulphur toning, resisted miserably, and was almost effaced; and when it was mixed with the hypo and gold (*E*), the resisting power of the latter toning was also destroyed.

This last mixed bath may be correctly taken as representing the condition of a hypo and gold bath which has been in use too long; for the chloride of silver in the print, in being removed by dissolution in the hyposulphite, decomposes the latter, just as does the chloride of lead in *C*, so that this set of trials clearly shows the strength and the weakness of the hypo and gold bath—the strength which it gives the pictures when new and fresh, and the weakness which it leaves when used after the hypo is decomposed, even although (as in case *E*) there be abundance of gold present, and even if fresh hypo (as in *E*) has been just added.

I may also remark, that a piece of sensitive paper, blackened by plunging into a solution of hydrosulphate of ammonia, was not perceptibly altered or lightened in colour by remaining in the nitric acid solution for a hundred and twenty hours.

This experiment seems to show that sulphide of silver, even when in thin strata, and formed in an albumen film, is not easily oxidized by weak nitric acid. In fact, a dense deposit of sulphide of silver is a tolerably permanent thing, as also shown by the permanence of negatives blackened with alkaline sulphide.

F. Was toned as an exception, without washing, in alkaline chloride. It is not necessary to say anything of this than that the resisting power of the print seemed to be equal to that of another piece in which the usual washing was given: but the lights suffered, and when exposed to the action of ozone, they turned much darker than in a corresponding piece which had been properly washed. The same result took place under the action of nitric acid.

Series 2.

The following were all sensitized in a forty-grain bath of plain nitrate of silver, and were fumed for five minutes with ammonia. From a large negative several prints were made, with equal exposures, on a day of equable light. These were cut up, and furnished the material for the following trials. In every case, a portion of the original was marked, registered, and preserved for reference, all of which specimens are now before me.

G. Toned and fixed in water, eight ounces; hyposulphite, two ounces; chloride of gold, equivalent to one grain of metallic gold; mixed hot, and used two or three hours after mixing. This toned to a rich purple, without any coppery shade.

Exposed to the action of ozone for sixty hours, the whites became a little discoloured. The picture scarcely lost anything of its strength, though its tone became slightly warmer.

A standard dilute solution of nitric acid, containing one part of nitric acid, sp. gr. 1.28, to twenty-four of water, produced no visible diminution of strength, by careful comparison, after an action of five days. This resistance is remarkable, and well worthy of observation.

H. Lime toning. Ozone for sixty hours changed the tone to dingy purple, and discoloured the lights very much.

Dilute nitric acid weakened the picture a good deal; discoloured the lights a little.

I. Alkaline chloride; effects about the same as the last.

J. Benzoate of gold toning.

K. Citrate of gold toning.

The behaviour of these two was very similar, and the resistance in both cases seemed rather better than with *H* and *I* to both ozone and nitric acid.

(*To be continued*).

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THE FERRIDCYANIDE OF POTASSIUM AND SULPHATE OF URANIUM INTENSIFIER.

Since we introduced this intensifier to English photographers, and stated our experience with it at the early part of this year, we have, from time to time, received communications speaking in high terms of the results it gave, and regretting that its use had not become more general. The following letter was accompanied by a print illustrating its action, consisting of an unusually perfect example of portraiture, at once soft, delicate, and brilliant, in a degree rarely attained. We have heard but one draw-back alleged in regard to this intensifier; in the hands of one skilful professional photographer it has produced charming negatives, but, in the course of printing, spots have appeared on the surface. Whether these are due to the intensifying agent or to other incidental causes remains to be determined. We shall be glad to receive the experience of any others who may have tried the process.

The letter is as follows :—

Sir,—In the early part of this year you introduced to the notice of your readers a new intensifier for negatives, a mixture of nitrate of uranium and ferridcyanide of potass. I am surprised that, apparently, it should have attracted so little attention. In my hands it has proved an admirable auxiliary. There are one or two precautions, however, in its use, which perhaps you will allow me to mention. The first is, not to use the solutions too strong; the next, not to mix them till required. If the solutions are used too strong, stains are apt to follow; still more so if they are mixed any length of time beforehand. In the latter case, the ferridcyanide appears to be set free in the solutions, and a red precipitate plays across the plate, and stains—with me, at least—thence invariably result; but if the solutions are sufficiently dilute, and mixed directly before use, I know of no intensifier so satisfactory and more under control. It may be used either on the wet plate or the dry, previously immersed in a dipping-bath of water. It rapidly changes the colour of the deposit, either to salmon or red, according to the length of time of application, or the strength of the mixture. In my experience, it does not fill up the fine lines, although, I think, there is some thickening of the film; nor does it destroy half-tone.

I have used it all this season in the following manner:—Starting with your formula of twenty grains of each to the ounce of water, in separate bottles, I dilute down according to the requirements of the negative, using for the primary development saccharo-sulphate of iron. I have but little need of much intensification, so that to twenty grains to the ounce of water I add three ounces more of water, and mixing the solutions—often two salts in equal proportions—I gain all necessary extra strength in two or three minutes. If I had weaker negatives I should, per contra, use stronger solutions. They are very cleanly in use, and the proofs from the negatives are delicate and spirited.

I shall be glad to learn if any other of your readers have experimented in the same direction. Many really useful novelties are from time to time introduced to the photographic public, and laid aside, either from some disappointment in the first efforts, or from want of a little perseverance; but this is one that I think fairly claims a more extended trial.—I am, sir, your obedient servant, R. M. S.

Exmouth, 3rd November, 1866.

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NOTE ON THE EMPLOYMENT OF IRON DEVELOPERS.

BY M. REMELE.*

It is a well-known fact that the addition of acetic acid to the developer, for the purpose of preventing the image becoming fogged, materially interferes with the development of dark shadows—a disadvantage which is only overcome by prolonging the exposure to an appreciable extent.

As the result of numerous experiments, I have found that a mixture consisting of three parts of acetic acid and ten parts of sulphate of iron answers very satisfactorily in preventing fogging with most collodions. The amount of alcohol to be added depends entirely upon the state of the sensitizing bath.

The following results have been obtained by me while working with different formulæ:—

A.—Sulphate of iron	10	parts
Acetic acid	3	,,
Alcohol	5	,,
Water	100	,,

This developer acted very rapidly; it gave intense blacks, but was difficult to control, owing to the rapidity of its action.

B.—Sulphate of iron	5	parts
Acetic acid	1½	,,
Alcohol	2½	,,
Water	100	,,

This gave as much detail as the last, but the half-tones were not so soft and harmonious; its action was clearer and slower.

C.—Sulphate of iron	5	parts
Acetic acid	1½	,,
Alcohol	2½	,,
Water	150	,,

This was slower in its action than formula B, and gave less detail.

D.—Sulphate of iron	5	parts
Formic acid	1½	,,
Alcohol	2⅓	,,
Water	100	,,

This formula was sufficiently rapid in its action, and gave very soft details. The dark shadows were not so clear as those given by formula B, and the colour of the precipitated silver was quite different to that formed with acetic acid.

E.—Saccharo-sulphate of iron	5	parts
Acetic acid	1½	,,
Alcohol	2½	,,
Water	100	,,

Very rapid in its action, giving intense blacks.

F.—Sulphate of iron	20	parts
Aceto-gelatine	20	,,
Water	400	,,

This developer is slow in action, gives intense blacks, but furnishes a very hard picture.

By these experiments it will be seen that formula B possesses the most advantages, with the exception that some of the other formulæ, containing less acetic acid, do not demand such a long exposure. In particular instances, when very soft pictures are required, formula D may be employed with success; if, however, an intensely vigorous image is desired without softness, formula F, containing aceto-gelatine, will furnish the best results.

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* 'Bulletin Belge de la Photographie.'

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Proceedings of Societies.

Amateur Photographic Association.

On Thursday, Nov. 1st, a Council Meeting of the Amateur Photographic Association was held, James Glaisher, Esq., F.R.S., in the chair. The following members and subscribers were elected:—

The Right Hon. the Earl of Bantry; Captain P. A. Elphinstone; J. H. Craigie, Esq.; A. G. Kortz, Esq.; J. Bull, Esq.; A. Pirie, Esq.; Miss Cecil Trower; Major G. E. Thomas; Mookurrum ood Dowlah; G. H. Wood, Esq.; H. Ackerley, Esq.; A. Y. Herries, Esq.; J. H. Ritchie, Esq.; W. Dalton, Esq.

The meeting, which was called chiefly for the awarding of the prizes, was adjourned, it being found impossible to determine upon the award at that time. A. J. Melhuish, Hon. Sec.

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Correspondence.

PHOTOGRAPHERS' RELIEF FUND.

Sir,—Every time I have read in your periodical about a "Photographers' Relief Fund," I have felt that I should like to say something on the subject; but as the best way of treating such a matter is to begin by sending a cheque towards its funds, and as I have left off banking since the Royal British Bank developed its drying process, I could not do so, and therefore abstained from a communication. Now, however, that reiterated painful instances are fresh under notice, I think we all ought to do much or little, according to our circumstances, in order to establish definitely such a beneficial association. For my own part I am willing to tender one thousand pictures of any well selling subject, printed in my permanent process (Email), the proceeds of which, at 1s. each, would be £50 for the said funds, as I should expect that every dealer would transfer the proceeds without reserving a profit. Say, if, for instance, H. R. H. the Prince of Wales would sit for it, at Messrs. Southwell Bros., or any other establishment, I will undertake to execute the whole order in one day (if bright).

If, therefore, any photographer, either professional or amateur, would get a negative for the above process of a subject which may sell well, I shall be most happy to assist too, or forward all the information required to that effect. In fact, an over-exposed, not intensified negative, where the contrast of light and shadows is very soft and very moderate, will answer very well; the background should be graduated, or rather light.—I am, sir, yours most obediently,

P. Taglis.

6, *Queen's Terrace, Camden Road, November 5th*, 1866.

P.S.—I have just thought of another way to raise the funds for the Photo. Relief, viz., amongst photographers, both professional and amateur, we have many distinguished personages of title and means. Suppose, then, a fancy fair was held at the Crystal Palace, or elsewhere, for that purpose, I would undertake to print and deliver a dozen pictures to every sitter *while waiting*; in fact, in a few minutes. Of course I suppose the place to have a glass-room and all other conveniences. I may add, that though I have mentioned working so quickly, I believe that the permanency of the pictures is quite as certain as any ordinary negative.

[The process to which our correspondent refers is one which has hitherto received comparatively little attention in this country; but has been practised in Paris for several years, where it is known as Moitessier's process. It consists in producing a transparent positive in the camera by the wet collodion process, and transferring it to enamelled paper. The image consists, of course, of silver, but it possesses the same probability of permanency as that of the ordinary negative. Some of the results which we have seen are very pleasing.—Ed.]

NEGATIVE VARNISH MAKING.

Sir,—I should be glad if you would give me space in your valuable Journal for a few remarks on the latter portion of the communication from Mr. Reeves in your last number. And in the outset let me remark that I fully agree with him that it is the duty of photographers to study economy (though not at the expense of efficiency); and I also gladly admit that the profession owes its thanks to gentlemen who are willing and able to come forward and assist them in carrying out so desirable an object. At the same time it appears to me most desirable that information of the character contained in Mr. Reeves's communication should always be of the most reliable description, and, as far as possible, based upon the results of large experience. I cannot conceive that such can be the case with respect to the formula for negative varnish given by your correspondent. By way of showing that I have some claim to speak on this subject, I may mention that I have been engaged for some years in the manufacture of photographic varnishes. I should not, however, presume to offer an opinion on this matter, but that a few years since, at the request of a very successful amateur in this city, I undertook a series of experiments on the various materials entering into the composition of these varnishes. In the course of these experiments, which extended over a considerable period of time, I think I may venture to say that I operated on almost every species of gum and gum-resin to be met with in commerce, and on every description of solvent. The result of these experiments proved conclusively to myself, and also to the gentleman at whose request I undertook them, that no varnish containing any large proportion of the shellac of commerce could, by any means, be made to meet the requirements of photographers; and I feel much confidence in expressing the opinion that the profession will do well to act with some caution before they commit themselves to the use of a varnish composed entirely of this material. Another point of much importance in the making of negative varnish, left unnoticed by your correspondent, is the strength of the solvent, which varies much in different samples; and in the case of methylated finish, the quantity and description of gummy or resinous matter held in solution should also be taken into consideration. I may also state (and I feel sure that I shall have the confirmation of every practical maker of varnish) that it is impossible to specify with exactness the quantity of gums or gum-resins necessary to produce a given quantity of varnish, owing to the variable proportions of soluble and insoluble matter contained in them, which differs in almost every sample met with in commerce, so that it is only by considerable experience that the required result can be obtained with certainty. Thanking you for your courtesy in inserting these brief suggestions, which I trust may be of service to the profession, I am, your obedient servant,

W. F. Young.

Salisbury, November 6th, 1866.

[We also have given considerable attention to the manufacture of varnishes, and made many scores of experiments with almost all kinds of gum-resins and combinations of them, and every known solvent. Our final conviction was, that a mixture of shellac and sandrach gave the best result for a negative varnish. We endorse our correspondent's remark as to the variability of various samples of resins often requiring the use of different proportions, &c.; but we must add, that in giving publicity to the communication of Mr. Reeves, we did so unhesitatingly from our knowledge of the fact that he was an old and skilful photographer who to considerable chemical knowledge added extended practical experience; his communication possesses, therefore, the weight due to these considerations.—Ed.]

STREAKS ON THE NEGATIVE.

Sir,—Seeing lately various letters from correspondents, also your leader in the News of last Friday, on "Streaks on the Negatives in the Direction of the Dipper," allow me to offer my mite on the subject. Some years ago, I was much troubled with that form of marking. After careful observation I came to the conclusion that the dipper was a good deal to blame. When a plate is plunged rapidly down in the silver solution, the dipper and plate will carry a small quantity of air with them; that air, rising to the surface, will cause streaks, more especially if the bath is nearly upright. To remedy this, I had the ledge on the dipper made thinner than the plates in use, tilted the bath more horizontally, and very slowly immersed the plates in the solution. The latter is a cure of itself, provided the plates are immersed slowly enough; in fact, if a plate is put a quarter of an inch into the solution, and allowed to remain a second before thoroughly covering, no marks will be visible, no matter how quick they are sent down after. —I am, sir, yours respectfully,

H. L. A.

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Talk in the Studio.

Cornwall Polytechnic Society.—We are informed by a correspondent, referring to a paragraph in our last announcing the resignation of Mr. Sydney Hodges as Secretary of the Society, that although photographers are indebted to that gentleman for much courtesy and attention, the origin of the photographic department was not due to him, but to Mr. J. C. Stephens, to whose effort, also, that department owes much of its success. At a recent meeting it was suggested by some of the judges in the photographic department that a medal should be given to Mr. J. C. Stephens, for his skilful management of the photographic department for some years past, and for having materially advanced that portion of the exhibition. It was accordingly duly proposed and seconded and unanimously resolved, that the first silver medal be awarded to Mr. Stephens. It was further resolved that the recommendation of Dr. Le Neve Foster, as Secretary, with Mr. J. C. Stephens to act as Assistant, be adopted. It was also resolved that a first-class medal, and some suitable testimonial, should be presented to Mr. Hodges on his retirement.

The Photographic Society.—At the meeting to be held next Tuesday evening, November 13th, Mr. Claudet will read a paper "On the Introduction of Harmony and Artistic Effect in Photographic Portraiture by equalizing the definition of the various planes of the Figure." Since Mr. Claudet's paper was read before the British Association, considerable discussion on the subject has arisen, the chief part of which, however, has been devoted to questioning the originality of the plan proposed. We would suggest to members, in reference to the forthcoming discussion (which cannot fail, if managed aright, to be alike interesting and instructive), that whilst the question of originality or authorship is not unimportant, it is much more important to consider, first, if the end proposed be desirable; and, next, if the means proposed are the best for the purpose. The answer to these questions will be most interesting and important. We would also suggest to members that it will increase the interest if they can bring with them examples of pictures in which depth of focus and softness have been obtained by various means, either optical or mechanical.—*Photographic Journal.*

Photography in Brussels.—Mr. E. Lancaster sends us an account of the Volunteer visit to Belgium, from which we make the following extract:—"I saw some very fine portraits, both plain and finished; amongst them were some of the largest direct photographs I ever saw; they were very good, and did not appear to be touched. Their cartes were good, but not better than ours. I saw some enamels, but no opals. But whilst the portraiture was quite up to the mark of our best establishments, their landscapes and architectural views are signally inferior. Some of the views which I saw—as, for instance, one of the west front of St. Gudule—was taken with so bad a lens that it represented the two great towers with strongy curved lines inclining towards each other: in fact, Brussels has yet to be well done for the stereoscope, and it would pay a capable man to go over to do it. The photographers do not seem nearly so numerous in proportion as in England, and they seem remarkably free from the low, ignorant fellows who infest the profession here. I saw no touting or attempts to cut each others throats by advertising miserably low prices. The price for cartes is mostly from nine to twelve francs the dozen—and francs, though nominally only tenpence, represent our shillings there. I saw a print of a group of riflemen who were staying at the same hotel as ourselves; they were fourteen in number; size of print, whole plate, about 8½ by 6¼. They each took a copy, for which they were charged six francs. The photography was good, but of course, as is usual where there are so many figures, some had moved, and some were not in good focus. I did not go up into any of their ateliers, so saw none of their internal arrangements."

Mr. Woodbury's Photo-Relief Printing Process.—At the late soirée in Manchester in connection with the Social Science Congress, this process was worked in the presence of the audience by some of the female assistants of the Company, and excited much interest. About one thousand prints were distributed amongst the visitors, and when these were exhausted the demand for specimens was so eager that as much as 10s. were offered for examples of the process. The noble president, Lord Shaftesbury, expressed a deep interest in the process, and subsequently visited the works of the Company, where he again carefully examined the operations. We may remark, in passing, that Mr. Woodbury has just sold his French patent, and the process will be speedily introduced in Paris for purposes of publication.

To Correspondents.

J. Herbert.—There is no announcement at present of an exhibition of photographs to be held in 1867 under the auspices of the Photographic Society, and we do not think it probable that there will be one. The most important display of photographs will be in connection with the International Exhibition in Paris.

K. K.—A hot water bath may be used for cementing glass on to opal pictures with Canada balsam, and in inexperienced hands will be safer than a Bunsen's burner. The Canada balsam should be prepared for use by being subjected to a heat not greater than 212° Fah., to drive off the essential oil which, in combination with the resin, forms the balsam. The experienced manipulator ascertains when the right condition is obtained by the smell, or rather the absence of the odour of the essential oil. Opticians use a ring gas burner, upon which a thin plate of sheet iron is placed. The application of too much heat will discolour the balsam, and also destroy its toughness as a cement. The application of a high temperature would entirely change the constitution of the balsam, and render it useless as a cement. You will find practical details on p. 589 of our last Volume.

W. S.—The special defect of the print enclosed appears, so far as we can judge, to arise rather from the negative than from the paper. The negative appears to have been under-exposed. With such a negative it is impossible to print deep enough without obliterating detail, and when prints are not sufficiently printed (that is, when a sufficiently deep deposit of silver cannot be reduced), there is an invariable tendency to flat, mealy results, and feeble, poor tones. It is of course possible that such results should arise from defective paper; but the print before us suggests the negative as the cause; and the fact that some prints are brilliant and some bad, from the same lot of paper, tends to confirm this conviction.

T. Revon (Haute Saône).—Negatives for producing transparencies on glass by the wet collodion process, require to be very full of detail, and without much intensity. Negatives which give brilliant prints on paper will generally yield hard pictures when used for collodion printing on glass. When it is necessary to use such negatives for camera printing on glass, it is desirable to use a collodion containing a large proportion of bromide, and a strong iron developer. To secure a blue-black tone, use citric acid in the developer in preference to acetic acid. 2. The rich, black tone of albumen transparencies is due to the action of the albumen, and cannot be readily imitated on collodion. The best method of imitating it consists in toning the picture by means of a five-grain solution of bichloride of mercury, followed by dilute hydrosulphate of ammonia. A similar tone can sometimes be obtained by leaving the transparency for a few hours in an acid solution of hyposulphite of soda. 3. In working on dry plates or wet ones, the tone is modified by the acid in the developer: acetic acid tends to produce a brown or red tone, and citric acid a blue tone. Tartaric acid also produces a blue-black tone. Prolonged gold toning will produce a similar result. 4 The use of carbonate of ammonia in conjunction with hyposulphite of soda in the fixing bath is still in an experimental stage, and the best proportions have not been absolutely determined. 5. The dry process which, amongst English photographers, produces the best results and keeps best, is the collodio-albumen. The Gordon modification has produced very perfect results in some hands, but it requires very great care in preserving all the proper conditions and delicacy in operating. In very hot weather the plates appear to deteriorate rapidly by keeping. 6. The dry plates of Dr. Hill Norris, which are intended for long exposures, keep well. Those intended for rapid exposure soon deteriorate. 7. The collodions Nos. 1 and 4 are preferred for dry plates. 8. It is difficult to state with accuracy which is the best dark tent for the purpose of developing dry plates; but that described on p. 341 of our Eighth Volume, by Mr. Blanchard, will answer well. 9. Ordinary water colours, with a little albumen added, answer well for retouching albumenized prints. We do not know of any colours prepared especially for retouching.

H. C.—It is possible that your chloride of gold is neutral, and possibly your acetate of soda slightly alkaline, and this would account for the hard toning. Has any decomposition taken place? Is the gold precipitated, or does the solution remain colourless? Sometimes touching the solution with fingers which have been in contact with hypo will spoil the bath, but this will generally be indicated by its turning brown. Adding more gold will sometimes set the matter right. If the solution be colourless, showing no decomposition or precipitation, add a drop of hydrochloric acid, then neutralize by adding about two grains of bicarbonate of soda, and try.

D. S. C.—The formula to which you refer, in which it is directed to add three grains of iodide of potassium to each ounce of nitrate solution, contained a printer's error; it should have been to a pint of solution. Pure iodide of potassium will of course, if added in much larger proportion than this, cause a precipitate of iodide of silver. The bath will not be injured, however, beyond being slightly over-iodized, and if you add an equal bulk of solution, without any iodide at all, the whole will be in proper condition.

E. Lancaster.—Thanks. We have made an extract.

North Light.—The general design of your studio seems to be as good as the dimensions and other circumstances will permit. We should be inclined to have, if possible, some side-light in the other side, but not quite so much as on the north side. It could be excluded by blinds when the sun shone, and would often be useful in dull weather. In such a narrow room, with only one side illuminated, you will at times have heavy shadows on the unlighted side.

Photo.—In such a studio as you describe, we should simply use white blinds on rollers for the roof, and running on rods horizontally for the side-lights.

J. Pender.—Any refiner will recover the silver for you from your residues, but we do not know whether they care to purchase such residues; of course they could not do so without previous testing to ascertain the amount of the metal present: besides, it would be troublesome to send the solutions to a refiner. The best plan is to precipitate the silver, as we have often described, by means of liver of sulphur. The sulphide of silver thrown down can then be easily sent to a refiner for reducing, and he will either return you the silver obtained, or its value in money, or in nitrate of silver, &c.

W. Baker.—Thanks. Scarcely suitable, as being really a chapter in elementary chemistry.

T. A. (Yarmouth).—The matter simply stands over until we have a little leisure to carefully consider the matter.

G. J. Tear, acting on a recent suggestion in our pages, has obtained from the Incumbent of Kennington Parish, permission to use the school-room for a meeting in connection with a "Photographers' Relief Fund." We commend his good will and effort; but we fear that for the present they will not be available. In the first place a meeting, when held, must be in a central position; and in the next, influential men must be first secured to initiate the movement. Some specific personal effort on the part of some one having the ear of such men must first be made. We regret that the absorbing nature of our own duties leaves us little time for such work, or we should at once endeavour to obtain the direct action of a few men of position. There will be at the outset some absolute work for some one. Unfortunately at present, being everybody's business, it is nobody's business.

W. P. Glaisby has submitted for our opinion examples of the photographs of York Minster, noticed with commendation by Mr. Werge in his Note on the York Exhibition. As a whole, they are exceedingly fine interiors, superior to the average; some of them being very perfect indeed. Those most to our taste are: "The Choir looking West;" "The Interior of St. Wilfred's Church;" and the "South Aisle," which are very fine indeed.

"A New Washing Machine," and other articles in type, are compelled to stand over until our next.

Several Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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DIFFUSION OF FOCUS BY OPTICAL AND MECHANICAL MEANS.

The discussion at the Photographic Society on Mr. Claudet's paper, read by the Rev. J. B. Reade, on Tuesday night, reminded us of an old story in which a Scotch clergyman is stated to have remonstrated with a parishioner for sleeping in Kirk. The parishioner pleaded unconquerable drowsiness at sermon time. "Can ye no tak' a pinch o' snuff, mon?" urged the preacher: "Can ye no put the snuff into the sermon, minister?" responded the drowsy hearer. The position assumed by each seems to illustrate the position of parties in the diffused focus controversy. The diffusion of definition and the softness attending it seem—at least, so far as large portraiture is concerned—to be generally admitted as desirable. But one party proposes to secure it by moving the lens or changing its focus during exposure, and another desires to have it supplied by the optician; one would have it effected mechanically every time it is needed by the operator, the other would have it effected permanently in the lens; or, as finally proposed by Mr. Claudet, it may be effected by a combination of both the agencies proposed.

The question as to the origin of the method of moving the focus during exposure is not worth while discussing. It appears to have been tried by the Rev. J. B. Reade upwards of a dozen years ago; it was published shortly afterwards by Mr. Snell in the Society's Journal; it has been tried at various times by a score of persons who have talked about it only; probably by many scores who have never mentioned it; and the very large direct portraits by Mrs. Cameron, so much admired by painters, and some of which are as remarkable for their fine modelling as others are for their hopelessly blurred outline, are said to be produced by the very means under discussion. Mr. Claudet gracefully recognizes all this, simply regretting that he had not known it earlier; or that, if it did come under his attention, it did not make the impression on his mind to which, from his present view of its importance, he thinks it entitled. It is quite clear that Mr. Claudet had nothing to gain by bringing forward as his own a method which had already been published by others, as it would have served his purpose equally as well, had it occurred to him that the plan had been published, to have dealt with it as a neglected means of securing a given result, as dealing with it as a new means. And it is also clear that photographers are considerably the gainers by the discussion, inasmuch as a very important and comparatively neglected matter has been pressed upon their attention.

Assuming, then, that there is tolerable unanimity as to the desirableness of having all planes of a subject sufficiently well defined, instead of one plane only, the question is narrowed to this issue: How can sufficient diffusion of definition be best obtained? In relation to the moving of the lens, the mechanical difficulties of effecting it evenly, of effecting it in short exposures, of effecting it without general vibration, &c., have naturally been urged; but urged, we think, without quite sufficient consideration. It is more important to determine if the end can be best so attained. If the result to be gained be the highest excellence, the mechanical difficulties would be of small import. Difficulties have been described as things to be overcome; and assuredly mechanical difficulties of this kind would be overcome by the resources of mechanical science, if the end to be gained was the best attainable by any means.* We maintain, then, that the primary question is, By what means can the diffusion of focus be best attained? A question of secondary importance might follow, in the event of various modes yielding similar results, as to the simplest means of effecting the end; and it might finally be enquired whether circumstances might not arise in which it was desirable to combine both the proposed appliances.

There is one aspect of the discussion in which we heartily endorse Mr. Claudet's view. We hold all means to be legitimate which produce the best results. Such phrases as "unscientific," "heretical," "dodges," used as terms of opprobium to designate unrecognized methods of effecting certain ends, are always useless, and often mischievous. To say that a method is "unscientific" which absolutely effects the end desired, is simply to say that it is not properly understood. An old and oft-repeated story in connection with cotton machinery illustrates this. Much loss was constantly experienced in the early days of this manufacture by the soft fibre of cotton, in its first stage in the formation of thread, sticking to the wooden reels or "bobbins" on which it was wound. One old hand was noticed to escape this difficulty, and so produce more work with less loss than anyone else. His employers questioned him, and he was finally induced, for a consideration, to disclose his secret, which simply consisted in these words: "Chalk t' bobbins." The wooden reel or bobbin was to be treated with powdered chalk, to prevent the soft fibre adhering. This was simply a "dodge," but it has since effected a saving of many thousands of pounds.

To return, then, to the question, Which is the best method of effecting the end? We are prepared to affirm that photographers are scarcely yet in a position to give a decisive answer. Neither method has yet been much tried. The moving focus has been tried—or, at least, its trial avowed—by few, and without the best mechanical appliances. The manufacture of a lens with an intentional amount of positive spherical aberration has been little tried, and certainly as little avowed. Our own convictions are in favour of securing the end desired by the quality of the lens. for several reasons: first, because the amount of diffusion being absolute, the lens may be put into the hands of inexperienced and incompetent persons without risk of abuse from want of discretion on their part; next, because we feel that whilst a certain amount of diffusion of focus is desirable over all planes, yet there is generally one plane of greater importance—say that on which the eyes are found—which it is desirable should have crisper definition than, say, masses of hair. We further approve of the optical means from the success which, in our estimation, has attended the one avowed effort which has been made by Mr. Dallmeyer in his portrait and group lens, the results of which are most charming. And, finally, we approve of the optical means, because we feel satisfied that they best secure a certain amount of diffusion; and if ever a greater amount is necessary, the depth given by the lens can be supplemented by the method recommended by Mr. Claudet.

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* We are compelled, from the pressure on our space, to leave over a description of a method of effecting the motion of the lens adopted some years ago by Mr. Griswold, recorded in the *Philadelphia Photographer*.

There is another argument in the case which was suggested by the Rev. J. B. Reade. He pointed out that the method recommended by Mr. Claudet, of moving the back lens of the combination only, had the effect of altering the separation between the components of a portrait lens, of producing spherical aberration, and thus introducing in an indefinite degree the quality which Mr. Dallmeyer proposed to introduce in a degree carefully calculated for the end desired.

In adopting the optical means, it should be clearly understood that it can only be satisfactorily done when the lens is made for producing portraits of a specific size, and at a specific distance. To secure the best end the photographer must, as Mr. Hughes suggested, have his tool-chest, as other skilled handicraftsmen have theirs, with specific lenses for specific work. The skilled workman in any craft, whether engraver or carpenter, would not use a broad chisel for cutting a fine groove, nor a lozenge point to cut away a broad surface. The photographer who is unwilling or unable to invest in a variety of tools for his work, but is anxious to employ a lens-of-all-work, may, when he is anxious to obtain depth of focus, secure it by a very careful application of Mr. Claudet's method. But we think that in any case the time is come for the entire abandonment in photographic portraiture of lenses which give microscopic delineation of freckles and wrinkles in one plane, and absence of anything like definition in all other planes; and the universal employment of lenses which, giving *sufficient, but not too much sharpness*, at the point of focus, or circle of least confusion, also give a fair amount of definition for all important planes in front and behind the plane focussed.

One piece of advice offered is, at least, worth consideration. Try the two methods. Mr. Hughes challenged conclusions on the specimens of the modes exhibited. Photographers generally have not an opportunity of deciding in this way, as they have not access to the examples. But exponents of both sides of the controversy join in the advice: try both methods. Everybody concerned can easily satisfy himself as to the moving focus, and many can afford to try the lenses proposed to effect the end desired. To all who can conveniently do so, we recommend the advice given: try both plans.

There was one question which was not referred to on Tuesday, but which has an intimate bearing on the question. We refer to the production of large pictures by the solar camera. Sufficient depth of definition over various planes can be much more easily obtained without sensible loss of sharpness in a small image than in a large one, and such an image, skilfully enlarged, either by means of an enlarged negative or by the solar camera, will, of course, possess all the modelling of the small picture. With such examples of enlargement as those exhibited by Mr. Mayall and by Mr. Holroyd on Tuesday night, we think that this method of securing large pictures defined in all planes was, at least, worthy of more notice than it obtained.

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CARBON PRINTS BY THE SOLAR CAMERA.

Amongst the fine examples of solar camera work exhibited by Messrs. Holroyd, of Harrogate, were two pictures printed in carbon, the history of which is very suggestive. The tissue was prepared and sensitized by Messrs. Mawson and Swan in Newcastle-on-Tyne, and forwarded in this condition to Messrs. Holroyd, at Harrogate, a distance of eighty miles. The two pictures were then exposed in the solar camera at Harrogate, one for twenty minutes, the other for twenty-five minutes, and returned to Newcastle-on-Tyne, where they were developed by Mr. Swan. That which was exposed for twenty-five minutes was hopelessly overdone. The other, apparently from a negative somewhat denser, would probably have been better for one or two minutes longer. But the two important points to be noticed are, first, that sensitive carbon tissue only requires one-third of the exposure of silvered albumenized paper, a matter of the most vital importance to those who, in using the solar camera, print right out, instead of using development; and, second, that the prints are permanent, a point of still greater importance, for it is a lamentable thought that a large and perfect solar camera picture in silver is at best but a thing of a few years, doomed gradually to fade, and finally perish.

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LAC VARNISHES.

The question of the value of lac varnishes having come under discussion in our last, the following letter from a practical varnish-maker, having reference to the qualities of shellac, and also to the white or bleached lac, will be read with interest. The example of lac enclosed, produced by evaporation from the varnish, is exceedingly beautiful, as clear and pale as the finest amber, and exceedingly hard and tough, and is unaltered by digestion with strong methylated spirit. Mr. Nash's letter is as follows:—

"Sir,—In your article entitled 'Preserving Prints from Fading,' in referring to me, you remark, that I add a few drops of solution of nitrate of silver to a solution of bleached lac. There is a slight misunderstanding here. I always test for chlorine in solution by using a few grains of *fused nitrate of silver*, not the crystals; as the small amount of water present in the crystals or solution will produce, on first application, a turbidity in all spirit varnishes very similar to that indicating the presence of chlorine. Even water itself will precipitate the gum in solution; but by adding fused nitrate of silver to any varnish or solution containing chlorine, the action is almost instantaneous by the formation of a chloride of the metal.

"Knowing that shellac is the most durable and also the hardest gum, and at the same time most easily decomposed by chemical agents and heat, it occurred to me, about four years since, that it would be a great desideratum to purify it non-chemically; and the result was, after about two years' trial and many experiments, I at last succeeded, and produced the article of which I send you a sample, which I can warrant as being *absolutely pure* shellac. I also find, by treatment, it has gained the property of increased hardness and insolubility when dry, as some I evaporated to dryness last summer is not soluble again in spirits or by heat, as I found by heating some of the dried to a temperature of 500°, which carbonized it, but did not melt it; also boiling water merely rendered it flexible, not soft. In its hardness, insolubility, and capability of receiving a durable and brilliant surface, when dry, by polishing, it has very much the characteristics of amber; so that a varnish possessing the above qualities, and not injuring any article it is applied to, must of necessity be of very great importance; and have been advised eighteen months back to bring it before the public, but delayed doing so until I felt certain of the production of a solution in methylated spirits of an absolutely pure shellac. Enclosed is a sample of some of the varnish I evaporated last summer on a water bath, and on trial you will find that it is not soluble, either by spirits or heat.—I remain, yours truly, E. M. Nash.

Soho, W., November 10th, 1866.

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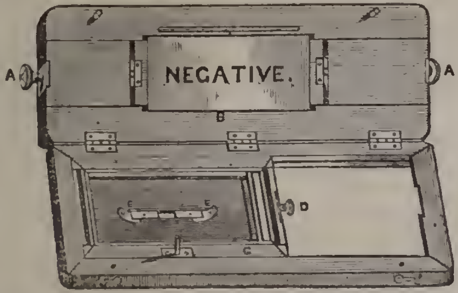
PRINTING STEREOSCOPIC TRANSPARENCIES FROM UNCUT NEGATIVES,

By Means of a New Printing-Frame.

INVENTED BY MR. C. D. SMITH.

This frame, as shown in the diagram, consists of two flat pieces of wood having openings in the centre. On one side the opening is of the size of the negative, on the front of which there is a sliding shutter or mask, with an opening of the size of half the stereoscopic plate, and which gives a clear printed margin to the picture. At each end of this half of the frame is provided a turnscrew, communicating with movable bars of hard wood, which are at each end of the groove made to receive the negative, and by which the negative is secured by clamping. In the other half of the frame there is a box or carrier to hold the sensitive plate, and which is made to slide from end to end. By this contrivance the right of the negative is opposite the left of the sensitive plate, and by a movement in the contrary direction the negative is exposed *vice versâ*. This half of the frame is provided with a spring catch, which fastens the box at its proper place. This box is provided with a brass pin, which communicates with a groove on the opposite half, and which moves the sliding shutter or mask along with it, covering up the half of the negative first exposed. At the back of the carrier two slip springs are placed, which, by releasing with a turnscrew, force the sensitive plate in direct contact with the negative.

Let us briefly recapitulate, and avail ourselves of the diagram.



The frame being opened, first secure the negative by clamping with the two turnscrews A A, taking care that the centre of the negative comes opposite the line B; then secure the sensitive plate in the sliding box or carrier, C, by means of the small turnscrew, D. The sliding box is then drawn to one end, and, by means of a spring, is held securely in position. The frame is then closed for printing the first half from the negative. At the back of the carrier, C, there are two slip studs which communicate with the springs, E E, under the sensitive plate. By pushing forward the studs the springs will press upon the plate; then turn the screw D, and the plate, being released, will be forced in contact with the negative.

Having exposed the first half the requisite time, push back the studs, and the plate will fall into the box-carrier; secure the plate by clamping with screw D; then slide the frame to the other end, release springs and plate as before.

The frame is also adapted for printing paper pictures, also negatives taken with a Latimer Clark's camera, and opalotype pictures.

◆

A MAKESHIFT METHOD OF DOING THE "DISSOLVING" VIEWS.

Our correspondent, "A Practical Man," writes: "As the time is now just approaching when all who have 'lanterns,' or cameras adapted as lanterns, will be endeavouring to make the best use of the means at their disposal, I would advise them to try the simple and inexpensive way of darkening or covering the mouth of the lens tube while the change takes place. Some, I dare say, will reply, Oh, stuff! Nothing like the 'fan and jagged tooth.' Well, then, they can procure the fan and jagged tooth; there are plenty to be had, and dealers will be very glad to sell. My hint is intended for those who are willing to try a method which may, with a little skill and ingenuity, be made to answer the purpose very well; the sole object being to deaden one picture while introducing the other, doing away with the old Gallanty Show method of abruptly pulling away the slide, and leaving a great circle of light till such time as the second view was clumsily pushed into the place of the first. The complete mechanical method of producing the change is costly, as it requires two lanterns, two lamps, and all the etceteras. This simple plan merely requires a piece of glass, paper, or other transparent medium, to be so worked in front of the lens as to produce a misty or deadened and confused effect while the subject is being changed, and gradually brought to view, clear, bright, and distinct.

If any of your correspondents can improve on this simple method of producing the desired effect, let them be kind enough to communicate their *modus operandi* for the benefit of others. A Plymouth photographer, last year, communicated an admirable plan of using the camera lens for the purpose, and also a lamp; that is all that can be possibly desired for a small room and private party.

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ON A MEANS OF INTRODUCING HARMONY AND ARTISTIC EFFECT IN PHOTOGRAPHIC PORTRAITS BY EQUALIZING THE DEFINITION OF THE VARIOUS PLANES OF THE FIGURE.

BY A CLAUDET, F.R.S.

The principal defects with which photographic portraiture is reproached by the most competent judges in art are the want of harmony between the various parts of the figure and the great harshness which is imparted to the features, particularly on the planes which are in exact focus, while the others are less and less clearly defined as they are more and more distant from that point. With well-constructed lenses, and by reducing as much as possible their aperture, it is possible to correct, to a great extent, the want of definition of the planes out of focus; but this cannot be done without a considerable loss of light, which entails the necessity of long sittings, during which the sitter is liable to move, and, if he does not move, cannot preserve all the time a very natural and pleasing expression. But supposing that everything goes on satisfactorily, the result, unavoidably, is a very harsh and unartistic production.

Some twelve years ago, an eminent artist, a great admirer and amateur of photography, struck with that imperfection, and wishing to have it avoided, recommended that photographers should take their portraits "a little out of focus." But it did not occur to him that it was impossible to distribute that want of focus equally over all the various planes of the figure; for unavoidably, some parts being a little out of focus, some others would be too much so, and even quite indistinct. For this reason the plan, incapable of fulfilling the desired effect, could not be usefully employed.

However, the suggestion was made in a true spirit of progress, and could not fail to attract the attention of many photographers, who, with the feeling of artists, considered how it would be possible to obtain the desired result by more effective and appropriate means. Several contrivances were imagined for that purpose. The first idea which naturally must have occurred was to move the tube of the lens, or to slide the plate-holder behind the camera while the person was sitting, by which the various planes of the figure could be consecutively brought in and out of focus; and this was supposed to be preferable to the plan suggested by our eminent artist.

On first consideration (this is probably the reason for its never having been seriously tried) such an idea could not but be judged an absurdity, on account of many theoretical objections, and the great difficulties it was supposed to present in its execution, and on account of the effect which, *à priori*, must have appeared lately—the production of great confusion in the whole image. Therefore, whether the few who went so far as to try to carry out this process did not succeed, or whether they did not find the result quite satisfactory to their mind, it is an undeniable fact that no photographer has made it a constant practice to take portraits by that means.

If, at the time that this idea was the subject of cursory conversation, and was mentioned in some photographic publications in no laudable terms indeed, but, on the contrary, passed without being carefully examined, this was a proof that no one was struck with any advantages it might possess: this must have even been my case; for when lately I communicated a paper on the subject to the British Association at Nottingham, I had not the least recollection of having seen it mentioned anywhere. Probably, as I have just stated, if ever I had heard of it, I must have at the moment considered it a dangerous and impracticable introduction in the art of photography, and the idea, like many inventions brought out of their time, or dreams which now and then appear for an instant, made no impression on my mind. In this case, I must have judged very hastily and (I may be allowed to apply to myself the expression) very foolishly; but such is our human nature!

In the course of my practice as a photographer, I have always been struck with the justice of the reproach made by artists as to the absence of harmony in photographic portraiture; for, in the most successful productions, there are always some parts which are exceedingly well defined, while others are entirely confused. To my mind, this was a great defect, which I could not but wish to correct; and I was constantly considering if there could not be some means to avoid the disagreeable effect arising from the contrast between the parts of the picture in focus and those out of focus.

It may not be found uninteresting that I should here explain how I came at last to understand that the desired effect could be obtained by the very means which at first had appeared to me so impracticable and so absurd, and to state by what gradual steps I have come to the conviction that, on the contrary, its adoption was a great improvement, of which photography was in need.

Whenever I had to take the portraits of persons with strongly marked features, I used to operate with the whole aperture of the lens, in order that the uncorrected spherical aberration might contribute to conceal the hard outlines, and soften down the effect of the picture; but at the same time, wishing to impart to the portrait a certain degree of correctness and definition. I thought of making use of a contracting or movable diaphragm I had invented, which, during the sitting, could gradually reduce the aperture of the lens until it was shut entirely. The effect of this diaphragm was to contract gradually the circle of confusion, and in doing so to impart to the picture a degree of definition which, being mixed with the soft effect produced by the spherical aberration, communicated a more agreeable expression to the likeness. and concealed the defects of the physiognomy without losing the character of the features.

I considered this a great improvement, and so it was in reality. But I was not entirely satisfied, because I could not fail to observe that by the action of the contracting diaphragm I was increasing the definition more on one plane than on all the others. Then I turned over in my mind how I could bring the sharp focus upon all the planes of the figure after having first operated with the whole aperture. The wish was father to the thought; and one day, while experimenting with my diaphragm and examining its effect, it suddenly occurred to me that, if it was impossible to have all the planes at once in focus, it was possible to put them in that state successively one after the other; and, naturally, this could be effected by moving the back of the camera or the tube of the lens, during the sitting, just the distance between the focus of the front plane and that of the back plane.

In order to test the effect of so moving the focus, I immediately tried the experiment upon my focimeter, which fortunately I have always at hand, and I found that the effect on the photographic image of the focimeter was precisely what was wanted—equal definition of all the planes, and equal softness of all the parts of the picture. The experiment with the focimeter convinced me in the most unmistakable and conspicuous manner that the plan of moving the focus had not the defects that want of reflection on my part had led me to suppose. In the photographic image of the focimeter I was able to study the result upon eight different planes, equally separated, 1½ inch in a depth of 12 inches; and comparing that image with another taken with a fixed focus, I saw at once that, as in the image of the focimeter taken by the moving focus, all the eight segments were equally and sufficiently defined, while in the image taken by the fixed focus some segments were entirely confused, I might, by moving the focus, obtain the same effect upon all the planes of the figure which I had obtained on all the segments of the focimeter.

But I must say that, without the conclusive experiment which the focimeter has offered to me, I should probably never have been convinced that moving the focus during the sitting was indeed no absurdity, but, on the contrary, a very sensible and (I add emphatically) a very scientific plan.

In my investigations I have, then, been most fortunately and efficiently served (which advantage it may be supposed that others have not had) by two of my previous inventions, which have helped me considerably to conceive and mature the plan. Without the contracting diaphragm, the action of which will be easily understood by the inspection of the object-glass containing it, I should never have been led to endeavour to soften the picture and make it harmonious by aberration mixed with definition; and without the focimeter, which I have also placed before the meeting, I should not have been able so readily and so efficiently to test scientifically and practically the effect of moving the focus during the exposure. This may, perhaps, explain the cause of my successs, and the reason why the idea may not have been sufficiently investigated and matured by others, who only thought of it in a cursory manner, and did not employ the right means for testing its value and capabilities.

The controversy which has lately taken place in some photographic and other scientific journals on the occasion of the paper I had communicated to the British Association at Nottingham, has brought to light that the idea of moving the tube of the object-glass during the sitting had occurred to several persons many years ago, just at the time that the "out-of-focus" plan had been so much agitated, and very strongly, as well as very justly, condemned. It appears that, among others, my friend the Rev. J. B. Read tried the plan of moving the tube, and obtained portraits by that means. This gentleman, instead of being angry with me for my having ignored his attempts in that direction, having seen his name mixed up in the controversy I have alluded to, called upon me some days after, and in the most friendly and honourable manner brought to me a portrait (positive on glass) which he had made of one of his friends twelve years ago by moving the tube during the sitting. On the first inspection of that portrait—although not a very bright specimen of photography—it was evident to me that it had been produced by that means. I expressed to my reverend friend how I regretted that I had not been able, in my communication to the British Association, to mention that he had thought of the plan and tried it a long time before—which acknowledgment on my part, and in this case, for the sake of historical truth and in due justice to him, instead of detracting at all from the interest of my paper, would have considerably increased its value; for my object was not to affirm that the same idea could never have occurred to any one before me, but that such a process was not practised, and to offer the result of the experiments through which I had come to the conclusion that it was desirable and advantageous to equalize the definition of all the planes of the figure, in order to introduce in the picture an harmonious and artistic feeling, and that the best and most effective means of producing that effect was to bring the focus successively upon all the parts of the figure, by moving the object-glass, or the frame holding the plate, during the sitting.

This plan, or rather its practicability, was new to me; at all events, I was sure that no photographers of note were in the habit of employing it, or else specimens produced by it would have certainly been, as such, exhibited at some of the photographic exhibitions, or seen in public or private circles; and having acquired the conviction that it would be the means of introducing a great improvement in photography in an artistical point of view, I came forward, endeavouring to bring it into general practice; and this was the object of my communication to the British Association. Admitting that the idea of moving the focus during the sitting had occurred to many photographers (which is a fact now unquestionable), there is another fact no less positive, that, no one having ever thought and proved that it was practicable and offering good results, it was for this reason condemned and abandoned. My object has been to prove that the plan is excellent, and that for this reason it should be adopted; and if my paper should be the cause of the introduction of a good plan in photography, it must be acknowledged that, in communicating my conviction to the photographic world, I have performed a meritorious act, for which I ought not to be exposed to rebuke and derision, but to receive the approbation of all photographers, lovers of our art. These are the reasons which have induced me to offer the result of my researches, experiments, and conviction; and I leave to the photographic world to judge of my motives, and to decide if, as a vulgar plagiarist, I have unfairly claimed a merit to which I was not entitled. I ought, perhaps, not to have alluded to the unfortunate and morbid disposition which, in all communities, characterizes a few perverse minds, and which, on the occasion of my communication to the British Association, vented itself in an exhibition of feelings of rancour and jealousy.

It has been objected that the plan I propose is difficult and dangerous in practice, on account of the risk of agitating the apparatus by the movement applied during the alteration of focus. I acknowledge this difficulty, but at the same time I cannot admit the impossibility of adopting means to render the apparatus as steady as is necessary. This is a mere question of skilful mechanical arrangements, and its solution cannot, I should think, for a moment embarrass materially any moderately ingenious and practical man. It would be strange indeed if an apparatus could not be made perfectly steady and firm enough to resist the small impulse requisite to make the tube of the lens slide a very short space on its mounting. Therefore this cannot be a serious objection to the plan; and, after all, so much the better if success depends on some degree of skill and care!

In the discussion which took place at the meeting of the British Association after the reading of my paper, it was stated that the equalization of definition could be obtained by other and what was called more legitimate means (are not all means equally legitimate which produce good results?); and in proof of the assertion, a photographic group was shown to the meeting in which every part of the two figures appeared in good focus and well defined. It was stated to have been produced by a lens, called triplet, constructed on an improved plan by Mr. Dallmeyer. The picture was certainly beautiful (without reference to the skilful execution and artistic taste displayed in the picture by Mr. Robinson, the eminent photographer, who had produced it); it was, indeed, more harmonious in its effect than photographic portraits generally are. But it was observed, by the astronomical eye of the President, that, although very perfect and showing a considerable depth of focus, still there were some parts of the picture which were less defined than the others, and that, as must be the case with the most perfect lenses, the mathematical focus was conspicuous on the middle plane. However, the picture showed that the lens which had produced it had some extraordinary and excellent qualities.

I have had an opportunity subsequently of trying myself one of Mr. Dallmeyer's triplet lenses for groups; and the result, to my mind, has been exceedingly satisfactory, proving the great merit of the optical combination of that lens. I have found that it has a greater depth of focus with good definition, on a longer range of planes, than any lens I have ever tried; but in experimenting on the focimeter, it is evident that all the planes (it is impossible to be otherwise) do not show the same degree of definition. I do not make this remark, on any account, as an attempt to disparage the merit of Mr. Dallmeyer's combination; for I declare that it is as perfect as any optical instrument can be, and that Mr. Dallmeyer merits the praises of the photographic world for his scientific and skilful contrivance. I offer him sincerely mine, and I do more; I thank him heartily for having enabled me to add to the beautiful effect of his lens another effect purely artistic, by moving it during the sitting, in order to equalize to a greater degree the definition of all the planes, and by those combined means to increase the relief of the picture, which is the characteristic effect of the equalization of definition. The comparison of a globe, a cylinder, or a cone represented by a fixed and by a moved focus, fully exemplifies the difference of relief obtained by the two processes, and how the relief is much stronger in the picture executed by the plan of moving than in the picture made by the fixed focus. This test is the most convincing proof which can be given of the advantages of the moving process, when it is applied to portraiture. But in the example of solids—such as a globe, cylinder, or cone (and it is the same in portraits)—a maximum effect of relief will be produced by taking the photographs with Mr. Dallmeyer's triplet, moved during the exposure.

The two processes have different objects and properties, which, instead of being antagonistic, complete each other; and it must indeed be a cause of congratulation that they should have been brought out nearly simultaneously, or associated in a very serious discussion. Therefore, far from superseding the plan I recommend of moving the focus during the sitting, the improvement of Mr. Dallmeyer makes it still more valuable and effective, because, the depth of focus being very great in Mr. Dallmeyer's lens, the equalization of definition of all the planes of the figure will be effected by moving the lens a shorter space, which will make the operation more certain and less difficult, while the definitive result will be more perfect.

Let us, then, congratulate ourselves that photography has been endowed at the same time with two improvements of such importance, which, working together and completing each other, will enable us to declare enthusiastically that photography, as a means of portraiture, has just made towards perfection the greatest stride of its short and wonderful career! Henceforward, its productions will not be unworthy of being ranked among the works of fine art, and will deserve and obtain the approbation and praise of those who are endowed with artistic feeling.

As we are assembled this evening to investigate the question of all the means which may be capable of introducing an artistical effect in photographic portraiture, it may not be out of place that I should refer to a circumstance which happened in my practice in the earlier time of the Daguerreotype.

Some twenty-five years ago, when struck with the imperfection of taking Daguerreotype (portraits as it was then the rule) inverted, by the effect of the direct operation of the lens upon the inward surface of the plate, I did not hesitate to adopt the difficult, expensive, and tedious plan by which I could offer to my sitters their portraits, not as they are in the looking-glass, but as they appear to their friends. Very curiously (and it may be interesting to relate the fact, which proves that nobody knows himself, and that "la vérité n'est pas toujours bonne à dire") I injured my interest considerably, because, as I found out afterwards, it is more lucrative to caress ignorance than to tell the truth, and to please the sitters than to please their friends. A great number of my sitters, seeing their nose, mouth, eyes, parting of the hair, bend of the head, attitude, dress, &c., &c., inclined, or placed otherwise than they were used to see them in the looking-glass, left me and went to some less scrupulous and fastidious photographer, who could take their portraits as they really were—only to themselves in the looking-glass. I have no doubt that a photographer who would add a reflecting prism to his apparatus, in order to have all his portraits taken inverted, would have a great success, because his sitters would find nothing strange or unpleasant in their appearance, and they would praise the photographer above all other professors of the art. It is really surprising how few persons understand the difference which exists between the natural appearance of objects and their reflection in the looking-glass; and I have displeased many persons by asking them to look at their portraits in the looking-glass in order to see them as they know themselves, and by trying to make them understand the cause of the difference.

But, to resume my point, I will state that, in order to re-invert the Daguerreotype image, to make it right on the plate, I had no other means than to adapt before my object-glass a mirror or a reflecting prism, and I adopted the last plan as the most perfect. But I had to employ prisms as large as the aperture of my lens, which was about three inches in diameter; and it was no very easy matter to obtain very homogeneous, clear, and colourless glass large enough to form a prism with two right-angle sides of 3 by 3. However, I obtained at last from my friends Messrs. Chance, Brothers, of Birmingham, to whom we are indebted for the best glass ever produced for optical and other scientific purposes, the most perfect prisms which could be made, and I succeeded with them in taking very good Daguerreotype portraits. My only object was to be able to take non-inverted portraits; and, to my surprise and that of my friends (as it might have been expected that the addition of a thick glass prism would occasion many objectionable results), I produced better portraits in point of pictorial character than by the simple inverted process; they all appeared in greater relief, softer, and more harmonious in effect. I recollect that at that time, the illustrious father of our art, Mr. Fox Talbot, happening to call upon me, I showed him the result of my non-inverted plan, and observed to him, as a point of scientific inquiry, how surprising it was that, although the rays of light had to pass through a great additional thickness of glass, the image was softer, more beautiful, and even in better relief than if it had been taken without a prism, and we discussed the curious matter, and soon found the explanation of the new and artistic effect produced. It was, that in passing through the mass of the prism, the rays had undergone some very slight deviations from their straight course, on account of some difference of density in the various parts of the substance; and these deviations being different for every point of the surface of the prism, the result of all the combined images was to impart an unusual degree of softness and harmony to the portrait.

Subsequently, considering this subject with reference to photography on paper, it occurred to me that a certain degree of softness might be obtained by placing before the lens a square block of thick glass, or before the plate in the camera some pieces of ground glass of various degrees of fineness, for the purpose of effecting the same deviation in the course of the refracted rays forming the image, and thus causing an harmonious effect. I tried the experiment, and the result was very good; but the question was in advance of its time, and for this reason, being neither perfectly understood nor sufficiently appreciated, I did not persist in experimenting on that plan. But I am surprised that at the time of the out-of-focus controversy, I never thought of trying again to soften down the harshness of photographic portraits on the collodion plate, as I had so successfully done with the Daguerreotype plate. But we are apt to forget our own inventions; and is it surprising if we forget the inventions of others? Such a plan would have been simpler, more effective, and might have produced a more perfect result than the plan of a "little out of focus," because the effect of the softening action would have been distributed equally through all the planes of the picture.

I beg permission to allude (I ask pardon for it) to some unworthy remarks which have been made by the atrabilious tribe always ready to run down everything brought out by others, and in this case to sneer at the labours of one who is known as a lover of his art and as a conscientious and not unsuccessful investigator of its scientific principles. It has been said that the plan I have proposed is a *heresy* in the science of optics, and a *dodge* unworthy of being adopted in photography! I think that there is nothing so heretical in the science of optics as to pretend to represent a solid with a converging lens, which can have but one mathematical focus, and consequently is incapable of imparting to all the planes of the solid an equal definition. Still, notwithstanding the heresy, and for want of a more orthodox system, we have been obliged to make the best we could with the limited capability of converging lenses; but we had no other alternative, and therefore had, *bon gre, mal gre*, to submit to the consequences. Now that we have found the only orthodox means by which a solid can really be represented in a correct manner, are we to be taxed with heresy? Is not this the most palpable confusion of reasoning? Contradictory minds are prompt to apply abusive and ridiculous names to things which are beyond their comprehension, and which they wish to run down; and that goes very far to influence the judgment of unthinking people. Call it a *heresy* or a *dodge* if you like, but look at the result, and if it is good, what matters the name given to it. When a dodge is capable of improving any production in art or anything else, is it not very ridiculous to condemn it and to refuse to adopt it because it is only a *dodge*. Is it not to a *dodge* that we owe one of the greatest improvements in steam-engines? A naughty boy, whose duty was to open and shut a valve during the action of the machine, wanted to go to play with his comrades; he thought that his absence would not be noticed if a cord attached by him to another moving part of the machine could do for him the work of opening and shutting the valve; and the *dodge* has ever since been adopted, and has made a complete revolution in the progress of steam-engineering. Are there no dodges in painting, sculpture, and other arts? and are they rejected when they produce the least advantage or improvement? Would a painter refuse to prepare his canvas with any common medium which might have been recommended to him to facilitate his work and give more brilliancy or durability to his colours, if he could be convinced of the efficacy of that dodge? Has the sculptor found that it was beneath the dignity of his art to transfer to the marble the proportions of his original model by the dodge of a pantograph, or of any mechanical means of the same kind?

Therefore let us hear no more of dodge and heresy, unmeaning expressions, conveying with them no argumentative reasoning; but let us employ all the means we can, whether they are empirical or scientific, simple or clever, and whatever be their nature, provided we can by their use improve what we do imperfectly. The *dodge* to be avoided is, to remain in the lurch in which we are, and to convince ourselves that what is bad is good. A *heresy* is to persist in the ignorance of the principles of the true creed of science, and to refuse to listen to instructive lessons when they are given to us in our interest.

Let us, then, without prejudice, jealousy, sneer, or bad humour, examine calmly any new theories or processes which may be offered to us by thoughtful and conscientious men, not with the predetermination and wish to find them faulty or erroneous, but, on the contrary, in the hope that even if we were a little sceptical at the beginning, we may, after examination, find in them something good—endeavouring, all of us, and each individually, with a brotherly spirit and love of our art, to make it perfect by all possible means. Now we must leave the field of idle and unprofitable discussion, and enter that in which labour, industry, thought, and science, applied to the same end by a united and active community, are certain to bring home a harvest of good quality.

Photography has made in a very short time immense strides towards perfection; but we must not be blind to its defects; and the best means to avoid or correct them is, not to conceal them from ourselves and refuse obstinately to acknowledge them before others, but to look for them with the intention of discovering them, and even to exaggerate them. By so doing we shall serve the interest of photography, and not by refusing to examine a new plan, and persisting in condemning it without having seen its results, because we fancy that they cannot be good.

I have this evening brought a number of specimens produced by the moving focus, and every one present will have the opportunity of judging of the effect of that process. These specimens are the first attempts made, without a long experience of the process, at a bad season of the year, and with all the difficulties inseparable from the want of practice with proper instrumental means. It is rather bold and dangerous on my part to come before a body of skilful and experienced photographers with such attempts, and to expect that on their inspection they will all be convinced that less definition and more softness in the texture of photographic portraits are preferable to the excessive sharpness which they have always considered the important aim to be attained, and the great criterion of perfection in photographic productions. But I entreat them to shut for a moment the photographic eye, and to look at my specimens only with the artistical eye; and in so doing I hope that a great number will find that these portraits are more harmonious and more resemble works of art than those which are taken by the fixed focus. If they come to that conclusion I have gained my point, for they will not hesitate to try fairly the plan which I have proposed for introducing in photography certain qualities capable of increasing its popularity among those who judge of its merit rather from an artistical than from a photographical point of view. But I wish that it should be clearly understood that I do not recommend that portraits should no longer be taken by the fixed focus. Many persons probably will prefer that style, and they must be satisfied. The better plan will be to take portraits by the two processes, and to let the sitters choose the one they prefer. All tastes will then be satisfied. But if the moving process, notwithstanding its artistical qualities, does not please the public, we shall continue with the fixed process. We have only to try the experiment; and even should the result be considered a failure, I shall not regret the time, labour, and thought I have devoted in endeavouring to raise the artistic standard of photographic portraiture; if we have not reached the end purposed, we are now on the road to it. The mover of the focus controversy will not have stirred in vain the photographic world; it will ultimately produce its good.

DURABILITY OF ALBUMEN, AND OF DEVELOPED PRINTS.

BY M. CAREY LEA.*

Series 3.

Printed on ammonio-nitrate paper sensitized in a fifty-grain bath. Same precautions taken as before, and work executed on same day as Series 2, so that the results are comparable with that series, as well as with each other.

M. Benzoate of gold toning. Not sensibly different from *J.*

N. Lime toning. The strength in this case was somewhat lowered in the toning, and the resistance was diminished proportionately.

O. Alkaline chloride. About as with *I.*

P. Citrate of gold. Same as *M*, and a little better than *N* and *O.*

Q. Same toning as *G*, and same result. These two were strikingly superior in resistance to all the rest.

From Series 2 and 3, the following conclusions are to be drawn:—

1. That, in resistance to the action of the agents used, there is scarcely any visible difference between ammonio-nitrate paper and fumed paper; but what difference there is, is in favour of the fumed.
2. That citrate and benzoate of gold tonings are about equal, and that both show a little better resisting power than alkaline chloride and lime toning, and which last two are, as compared with each other, about equal.
3. That prints toned in a fresh bath of hyposulphite and gold show a marked superiority to any of those fixed and toned separately in resisting power.

Series 4.

The object of this series was to compare the influence of alkaline and sulpho-cyanide upon the strength of the picture when used as a fixing agent.

T. Toned with alkaline chloride, and fixed with hyposulphite.

W. Same, but fixed with a solution of sulpho-cyanide of potassium, one sulpho-cyanide to five water.

X. Toned and fixed with hypo and gold; same bath as *G*, but four days old.

Z. Toned and fixed in a bath of sulpho-cyanide, containing fulminating gold in solution.

Without reviewing these cases specially, it is sufficient to say, that the pictures fixed by sulpho-cyanide seemed to have equal permanence (so far as a single trial could indicate) as those treated with hypo. In some cases, details seemed to be preserved in the fixing which were not apparent in those fixed with hyposulphite. The sulpho-cyanide was not examined as to its fixing powers, that not coming within the scope of this examination.

Series 5.

The object of this series was to compare the strength of prints produced by the positive development process with the foregoing.

AA. Toned and fixed in a bath of sulpho-cyanide of potassium and chloride of gold, one day old; resistance to ozone and to nitric acid excellent.

BB. Toned and fixed in a bath of sulpho-cyanide and fulminating gold, one day old; resistance excellent, but a reddish discolouration of the white.

CC. Toned and fixed in hyposulphite of soda and chloride of gold, five days old; toned to a warm black; resistance excellent.

DD. Same, but left in the toning and fixing bath for five hours. This protracted exposure to hyposulphite made no difference either in the tone or the resisting power.

EE. Developed with gallic acid on plain paper, and not toned. The colour of this print was a fine sepia brown; but, under the action of the agents above described, it almost completely vanished. The residue of colour left behind might be roughly estimated at five per cent., so that ninety-five per cent. of the strength was gone.

FF. Developed with gallic acid, and toned with alkaline chloride to a warm black; resisted a little better than the last, but failed miserably in comparison with all the sun prints.

GG. Developed on plain paper with gallic acid, and sulphur toned. (See *C*, Series 1.) Here the resistance was not so good as with the gold-toned developed print (*FF*), but better than with the simply developed print (*EE*).

But all these developed prints, whether left as developed, or toned afterward, were such utter failures, as far as resistance to oxidizing agencies are concerned, as to show that this method of printing is entirely to be condemned, and ought never to be resorted to except when sun-printing is inapplicable. When we consider the amount of praise which has been, by some authors, bestowed on this method of printing in this very respect of permanency, and the utter absence of foundation on which such extemporized opinions have rested, we are led to regret that more care is not taken before pronouncing on questions which require only patience and experiment to answer correctly.

A further series of a considerable number of trials was made, in which specimens similar to the foregoing were exposed to the action of the same dilute nitric acid over a space of two weeks.

It seems needless to repeat in detail all these results; it seems sufficient to say, that they entirely agreed with the previous experiments already described.

Conclusions.

In describing the results given of many scores of trials, it is difficult, in the separate descriptions, to give the generalizations obtained from a careful comparative scrutiny of the whole series. I therefore collect below the following conclusions:

1. Albumenized prints, after toning, should remain in the fixing-bath from twenty to twenty-five minutes. Those which were fixed in ten to twelve minutes turned yellow in the whites when exposed to the action of ozone, plainly indicating that the action of hyposulphite had not been carried far enough.

[The action of ozone upon prints is always very instructive, inasmuch as it seems not improbable that the oxidizing effect of the atmosphere is more or less due to the presence of this agent in it, and proportionate to the quantity present.]

2. The turning yellow of prints by ozone (and probably by atmospheric air) seems to depend on other causes as well as the presence of silver; that is, in a thoroughly fixed print, ozone will often (perhaps always) not cause a yellowing of the whites, although traces of silver may be detected by hydrosulphate of ammonia; but imperfect fixing (see 1) always leads to yellowing by ozone.
3. The received opinion of the necessity of thorough washing before toning (in the case of separate fixing and toning) is correct. A contrary course is very injurious to the whites.
4. A thoroughly well-printed, toned, and fixed print (toned to black, or nearly) is not injured or faded by a very prolonged exposure to the action of dilute nitric acid of the strength used in these trials, viz., 4 per cent. of pure acid, sp. gr. 1·28.
5. Ozone acts more energetically. The specimens which, in all cases, best resisted its action were those that were fixed and toned at one operation, either by hyposulphite and gold, or sulpho-cyanide and gold.
6. Whatever difference exists in permanence between fumed prints and those on ammonio-nitrate paper not fumed, is, if any, in favour of the fuming.
7. Developed prints are greatly inferior in resisting power to any sort of properly-made sun-prints toned in any of the foregoing manners. Developed prints toned with gold are strengthened thereby, not weakened, as thought by Hardwich. Both these facts are contrary to received opinions, but are too certainly true to admit of a doubt.
8. Prints toned and fixed at a single operation give the greatest prospect of permanence, when the bath is fresh and the whole operation is properly performed; but when the bath used contains decomposed hyposulphite in any quantity (and the proportion present, it must be remembered, augments with every print immersed), the resulting picture is the weakest of all sun-prints, and almost as weak as a developed print. This is the case even if gold be abundantly added. No quantity of gold will cure the weakness of such a bath, which depends upon the presence of tetrathionate of soda, arising from the decomposition of the hyposulphite by silver salts in the print; nor will the addition of fresh hyposulphite cure such a bath. I have satisfied myself that a fixing and toning bath, in perfect order, may be spoiled by the simple addition of a little chloride of lead, which, like the chloride of silver and nitrate of silver, has the property of giving rise to the production of tetrathionate of soda.

It is, therefore, by no means with the intention of recommending this bath that I place these facts upon record, but only with a view of having all these operations set on their true basis. To affirm that a print fixed and toned together is necessarily weak, is as great an absurdity as to affirm that a developed print is stronger than a sun-print; and yet this has been done very widely, and by many is doubtless yet believed. But to adopt a system of toning and fixing which, whilst it commences right, rapidly deteriorates, without the power of the operator to discriminate at what point it ceases to be fit for use, would be a yet more serious mistake.

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* Continued from p. 537.

A NEW PRINTING SOLUTION.

BY H. J. NEWTON.[*]

It has appeared to me that the chief objection to weak silver solutions is, that they permit the albumen to be dissolved from the paper. In the ordinary practice we depend entirely upon the silver as a coagulator. My object has been to use the silver only as a printing agent, and to substitute other and cheaper substances to coagulate the albumen.

My formula is as follows:—

Nitrate of silver	25 grains
Nitrate of magnesia	25 „
Nitrate of potassa	25 „
Acetate of lead	5 „
Water	1 ounce.

I have successfully used a solution made up in this way till the proportion of silver had decreased to ten grains to the ounce. Inasmuch as a very weak solution requires an inconvenient time of floating, and the whole paper becomes soaked, I do not recommend less silver than is named in the formula.

Some of the advantages of the process which might not be anticipated, are the shortening of the time in printing to about one-half that commonly required, and a greater facility in toning. The prints fade out less in toning, and the toning should not go beyond a warm purple; no blueness or grey should appear, or the finished picture will be found to be over-toned.

One of the offices of the nitrate of magnesia in the formula is to prevent the crystallization of the nitrate of potash; without the nitrate of magnesia so much nitrate of potash as is named in the formula could not be retained.

[Mr. D. C. Chapman, a well-known and high authority, informs us that he has tested the process, and finds it all that Mr. Newton claims. He uses it in his daily work.—Ed. *A. J. P.*]

CONTRIBUTIONS TO THE HISTORY OF GRAPHITIC ACID.

BY M. GOTTSCHALK.[†]

To prepare graphitic acid, the author directs to add nitric acid in small portions to one part of purified graphite, and three parts of chlorate of potash, placed in a flask cooled with ice; then heat in a water-bath to 70°. After decanting, purify the residue by extracting it by nitric acid of 1·28, expelling any excess of the acid by gentle heat, washing the residue in alcohol, then in ether, and finally heating in a water-bath, to expel the alcohol and ether; there thus remains a light pulverent matter. The author considers that the substance described by Professor Brodie as graphitic acid, with the formula $C_{11} H_4 O_6$, is not the last stage of the oxidation of graphite, but there may be obtained, by prolonging the action of the oxidizing mixture, a substance having the composition $C_{11} H_4 O_6$, being a yellow crystalline, homogeneous mass, formed of transparent flakes.

This surface is very hygroscopic, and colours in the light until it becomes nearly black. It reddens tincture of litmus when wet, and is slightly soluble in water. Its solution deposits amorphous yellow flakes under the influence of light or heat, or by addition of a salt or a diluted acid.

The graphitic acid is also slightly soluble in alcohol, but not at all so in ether, wood spirit, essence of turpentine, benzole, chloroform, and sulphide of carbon. Heat decomposes it, giving water and carbonic acid. Alkaline solutions, lime, and baryta water colour it; when heated, the colour deepens till nearly black.

During the washing of graphitic acid treated by potash, the liquid is at first colourless, but soon becomes brown, and the product remaining on the filter greatly increases in volume. The brown alkaline filtered liquid, if boiled after having been neutralized by acetic acid, deposits brown flakes, and returns to its alkaline state, which proves the presence of an alkaline combination soluble in alkalies, and decomposable by boiling.

The brown substance remaining in the filter, after treatment by an alkali, washed with water, and dried at 100°, is difficult to pulverize, and becomes very electric by friction. It contains 11·2 to 11·3 per cent. of alkali.

This graphitic acid behaves in the same way in presence of ammonia; only, as ammonia volatilizes readily, the precipitate inflates by boiling, and finally redissolves.

The author has verified the reactions of sulphide of ammonium and stannous chloride on graphitic acid observed by M. Brodie.

Monohydrated sulphuric acid grey-green; by the addition of water it returns to yellow, and if boiled, decomposes completely.

Proceedings of Societies.

North London Photographic Association.

The usual Monthly Meeting of this Association was held at Myddelton Hall, on the evening of Wednesday, November 7th, Mr. W. W. King in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the Society: Messrs. Griffith Smith, W Gillard, Walter Woodbury, Jabez Hughes, J. Morledge, F. Lipson, F. J. Stowell.

Mr. E. Dunmore then read a paper, describing a "Photographer's Recollections of a trip in search of the Picturesque," and subsequently exhibited a number of specimens obtained under difficulties on a trip full of disasters, discomforts, and in bad weather.

After a little desultory conversation,

The Chairman called attention to three packets of photographs exhibited by Mr. Ross. The first series consisted of cabinet pictures of Canterbury Cathedral, by Mr. Stuart, and were taken by Ross's new doublet of 6¾ inches equivalent focus. They were all fine, he remarked, and one of them was, he thought, the finest interior he had ever seen in his life; he especially referred to the Choir. The stop used was one-sixteenth of the focus of the lens. The next series consisted of stereographs of the same Cathedral, by Mr. F. Good, taken with Ross's doublet of three inches equivalent focus; stop, one-thirteenth of the focus. The third series consisted of some cards by Mr. Foxlee, and some by Mr. Webber, taken with Ross's 3A card lens, six inches focus, 3¼ inches aperture.

Mr. Foxlee, in answer to an enquiry, said the exposure, with full aperture, was nearly instantaneous.

After some conversation and votes of thanks, the Chairman announced that at the next meeting he hoped Mr. Spiller would read a paper recording the continuation of his experiments stated some time ago.

The proceedings then terminated.

South London Photographic Society.

The usual Monthly Meeting of this Society was held at the City of London College, on the evening of Thursday, November 8th, Mr. Sebastian Davis in the chair.

The minutes of a previous meeting were read and confirmed.

The Chairman read a letter from Mr. Hart, who had promised a paper for this evening, regretting that his unavoidable absence from town would prevent his reading the paper that evening, but hoping that nothing would prevent his fulfilling his engagement at the next meeting. The Chairman said that a paper had also been promised by Mr. Wall, but he was not present, nor had any communication been received from him. The proceedings, in the absence of a paper, were of a desultory and conversational character.

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[*] 'American Journal of Photography.'

[†] 'Journal fur Praktische Chemie,' xcv., 321.

The Chairman read a note from Mr. Ross, accompanying some fine specimens of cabinet photographs of Canterbury Cathedral, by Mr. Stuart, taken by Ross's new doublet of $6\frac{3}{4}$ inches equivalent focus, with aperture of one-sixteenth of the equivalent focus; some stereographs of Canterbury Cathedral, by Mr. F. Good, taken with Ross's stereo-doublet of 3 inches equivalent focus; and some card pictures by Mr. Foxlee, and by Mr. Webber, taken with Ross's extra rapid card lens of 6 inches equivalent focus, and $3\frac{1}{4}$ inches aperture. The specimens were examined with much interest and approbation, the cabinet pictures especially being much admired.

The **Chairman** called attention to some examples of 16 by 12 subject-pictures by Mr. Robinson, taken with Dallmeyer's new portrait and group lens. He remarked that in these pictures they had an opportunity of examining a carbon print and a silver print from the same negative. A few years ago it would have been thought impossible to secure the perfection of gradation in a carbon print which was illustrated in the specimen of Mr. Swan's process before them; the impression existing at that time, that the continuous gradation of half-tone peculiar to a photograph from nature could not be rendered by carbon printing; the gradation of engravings, which consisted of lines or dots, being at one time supposed to be the utmost to be hoped from carbon printing.

Mr. **Robinson**, in answer to a question, said the 16 by 12 negative, "Waiting for the Boat," was exposed eighteen seconds.

A conversation on Mr. Stuart's cabinet pictures followed, one (of the choir of the Cathedral) being especially commended. In answer to a question from the Chairman,

Mr. Ross stated that the lines were as absolutely true as it was possible to produce by means of a lens.

Mr. **Stuart** said that the negatives were intensified by a process described in the **Photographic News** in the beginning of the year, in which ferridcyanide of potassium and sulphate of uranium were employed. The results were exceedingly fine and delicate; the only drawback being that some of the negatives had become spotted in printing; whether from this intensifier or not, remained to be definitely ascertained. The negatives were fixed and dried on the spot, and intensified afterwards at home.

Mr. **Townsend** showed some fine prints from cloud negatives.

Mr. **Taylor** exhibited a print on the new leptographic paper.

Mr. **Robinson** said he had heard a gentleman remark that the prints should be described as by the *kleptographic* process, as from what he could learn it was an unacknowledged appropriation of Mr. Simpson's collodio-chloride process.

Mr. **Wharton Simpson** showed an example of cabinet portraiture by Mr. Notman, of Montreal, in which the proportions of the standing figure were somewhat smaller than those adopted generally in this country, although the picture and mount were of the same size.

The specimen was much admired, and the small proportions of the figure were commended. The height of a standing figure of a lady is $3\frac{3}{4}$ inches.

Mr. **Howard** showed some fine examples of landscape photography by the collodio-albumen process, fine cloud effects having been obtained by skilful manipulation of the skies.

A general conversation on dry process followed.

Mr. **Robinson** remarked that, as such pictures could be obtained by the collodio-albumen process, and as he never saw pictures equalling them by any other process, he wondered any other was used.

The **Chairman** remarked that the plates not keeping over a few weeks after final exciting was the chief reason for trying other processes. It was natural that photographers should keep trying others in order to secure, if possible, the excellences of the collodio-albumen process with others it did not possess. He asked Mr. Howard, as having had large experience, which process he preferred.

Mr. **Howard** said, for quality of results he preferred the collodio-albumen; for keeping qualities he preferred Fothergill.

Mr. **Robinson** said that he found the Manchester men taking collodio-albumen plates on a three weeks' journey, and it rarely happened that longer keeping was necessary.

After some further conversation,

Mr. **Stuart** said that Mr. Wilson had recently been working a method of intensifying with bichloride of mercury and gold.

In course of conversation it was remarked that a method of intensifying with chloride of ammonium and gold was described in the first volume of the Society's Journal.

Mr. **Simpson** said the method with mercury and gold would be found described in the last volume of the **Photographic News** (see Vol. IX., p. 443).

After some further general conversation, the proceedings terminated.

London Photographic Society.

The first meeting of the Winter Session of this Society was held at King's College on the evening of Tuesday, Nov. 13th, Mr. F. **Bedford** in the chair.

The minutes of a former meeting were read and confirmed, and the following gentlemen were elected members of the Society: Mr. J. J. **Shaw** and Mr. F. **Howard**.

A number of fine specimens of photography were exhibited on the table.

Mr. **Claudet**'s paper on the moving of the lens during exposure (see p. 543), was read by the Rev. J. B. **Reade**: the expanding and contracting diaphragm was exhibited, together with many specimens of the results obtained by moving the lens.

The Rev. J. B. **Reade** then read, at Mr. **Claudet**'s request, a note he had written to Mr. **Claudet**, describing some early experiments in moving the lens, and adding, that he still preferred the method of moving the whole lens, to the mere moving of the back part of the combination. He proceeded to remark that the end was better gained when a series of images slightly within the original outline were obtained, than when the successive images were larger than the original outline. He further expressed a conviction, that a reason for imperfections in some portraits was due to light reflected from parts of the face being polarized, and recommended to photographers the use of a Nicholl's prism, to avoid the evil.

Mr. **Mayall** said the paper to which they had listened, which was part science and part homily, and part neither the one nor the other, came with a very good grace from Mr. Reade. The question as to the originality of the plan having been given up by Mr. Claudet, it was less necessary to remark that the plan advocated was one which had been known to photographers for many years. But his objection was to the principle involved, and for this reason: it was impossible to produce a picture by super-imposing a succession of images without producing distortion. If this were so, it was unimportant which method of moving was adopted, as distortion was the result, and the individuality of the portrait was destroyed. This view was confirmed by the illustrative specimens which were exhibited, which reminded him of the results produced before achromatic lenses were made for photographers; and it appeared to him that if the back lens only of the combination were moved it would add seriously to the error. Mr. Reade informed them that if they took care that the successive images were within the first outline, the result would be less offensive than if they were larger than the first outline. He denied that it was necessary or desirable to use either plan. He believed that the only correct principle was that which Mr. Dallmeyer had for some years been trying, and which he had now succeeded in embodying in a lens, with such distributed definition that all necessary parts would practically be in focus. The aim of Mr. Claudet was secured, and the difficulties were surmounted, the focus being distributed over every portion of the object to be taken. He, like Mr. Claudet, could speak from long experience. He then referred to a large and valuable Voightlander lens he obtained many years ago, which possessed, unintentionally, a certain amount of aberration, and gave results very similar to the portrait which Mr. Hughes had produced by Mr. Dallmeyer's new lens. In condemning the principle advocated by Mr. Claudet, he wished to avoid anything unnecessarily unpleasant, but he could not allow a paper like that to which they had listened to be read at such a society without entering his protest. It appeared to him to be going back to the infant days of photography; whilst it was their duty to advance with the advancing science of the age. It was a bad compliment to the opticians of this day to suppose that they were unable to conquer the difficulties of earlier times, and the beautiful examples on the table of what could be achieved by a suitably constructed lens were an illustration of what skilled opticians could effect. He proceeded to refer to the advantages of the solar camera for large portraits, and mentioned that small pictures produced by his old Voightlander distributed pictures, and gave the best and softest effect for life-sized enlargements. Mr. Dallmeyer, in making a lens for portraiture, had set out with a definite idea that, instead of emulating the sharpness of an astronomical instrument, he would make an instrument which should produce in the image small discs instead of points; that this should be done in a definite degree previously determined, so as to distribute his focus over a large head, giving softness, and defining sufficiently everywhere. Whilst photographers were disposed to make their pictures as artistic as possible, he denied that they were to bow always to the dictum of artists. Theirs was an art-science, and their results should claim the quality of truth as well as beauty. In an art-science they used scientific instruments, and it was within the power of the opticians such as Dallmeyer, Ross, Voightlander, and others, to make instruments which produce all the effects obtained by this clumsy method, and without their inevitable defects. The results desired must be produced by combined agencies: first, by opticians giving them lenses suitable for the work to be done; next, by the chemist giving collodion which would register properly every gradation; next, by judicious development; and next, and not least, by lighting the image properly, so as to give relief and gradation. He believed that there was not one in five hundred of them who did not work with ten times as much light as was necessary for producing the best result. After a reference to the action of polarized light, in which he took exception to Mr. Reade's view, the speaker concluded by expressing his regret that he had felt compelled to object to the plan recommended in the paper, adding, that the examples confirmed his objections, and he thought the sooner the plan was abandoned, and the lens which superseded such a plan adopted, the better.

Mr. Jabez Hughes thought it scarcely possible to discuss such a subject without finding both points of agreement and disagreement. In the aim which Mr. Claudet had in view, the majority of the members would heartily agree with him. His aim was to improve large pictures by securing a soft and diffused definition. They were all, he felt sure, ready to honour Mr. Claudet, and to thank him for his efforts to advance their art-science in various ways. It was only by the efforts of such men as he, bringing forward their stores of experience and knowledge for the common good, that the progress of the art was secured. They honoured him, therefore, and thanked him for many things, and for bringing forward this subject under their attention, and for the examples he brought before them. But here he must change his path, and entirely dissent from him as to the best means to the end they all desired. With all due respect to Mr. Claudet, he must characterise it as a step backward. He would tell Mr. Claudet why the process, which it was now admitted was not new, had not been adopted. It had been tried by many, but had been found so surrounded by troubles in practice, as to be useless; and it had never come into recognition because of these troubles. Photographers had not adopted it, because they were satisfied it was not a great improvement, much less one of the greatest discoveries in the art, to be compared with the introduction of collodion, of alkaline toning, and a score of other great advances. The great question, in connection with the aim, which they must ask, was: Are we to recognize the use of an instrument without a sharp focus? How were they to decide the controversy, commenced many years ago, when the representatives of the two ideas were, Sir William Newton, who advocated softness at the expense of definition, and Mr. Shadbolt, who insisted on mathematical definition? He thought the question, in this day, would be easily answered. Photographers wished to produce soft portraits with a satisfactory amount of definition everywhere, and not mathematical diagrams. The lens was the photographer's tool, and a tool should be adapted to its end. They must use scientific tools when they wanted scientific truth, and others when they wanted artistic truth. Nobody admired sharpness in its proper place more than he did, and no one liked it less when out of place. He would not use a razor for the work of the paper knife. It was no use having sharp instruments when they did not require sharp results. It was like insisting that a painter should have all his brushes made with a sharp tapering point, when he required some for broad, soft touches. Let the photographer have his lens-chest just as the carpenter had his tool-chest, and use tools suited for the end required. He pleaded for the admissibility of lenses which would give them results like those on the table. Years ago opticians with a reputation to gain dare not produce them. Mr. Dallmeyer had for years been subject to private pressure, urging him to produce such lenses, and finally, having made his reputation as an optician secure, he had yielded to that pressure. Mr. Hughes then challenged comparisons of results on the table produced by Mr. Dallmeyer's lens and by the moving of the camera, and finished by recommending photographers to try both modes of securing the end in question, and abide by the result.

Mr. Mayall said he wished all the observations he had made to be understood as applying to portraiture. He did not quite agree with Mr. Hughes, that the photographer needed a tool-chest like the carpenter. Having such a lens as that which Mr. Dallmeyer had provided them, they ought to recognize no other.

Mr. Hughes explained that in some cases, and for some work, sharpness was desirable.

Mr. Allen said as in copying maps, for instance.

Mr. Dallmeyer said that having, during his investigations of this subject, devoted much attention to it, he intended to bring the results before the Society in a paper at the next meeting. He said it was easy to produce a lens with aberration, but it was much more difficult to produce one with an exactly calculated amount of aberration to fit it for given work, than it was to produce a perfectly corrected lens. Mr. Hughes had referred to private pressure, and he might here mention that it was chiefly due to the solicitation of Mr. T. R. Williams and some other gentlemen that he had been induced to introduce a limited amount of positive spherical aberration so to produce softness and diffusion of focus without offensive loss of definition. In reference to the moving of the lens, besides the other objections named, there was this specific one: in using such a method, even with the greatest success, all the planes would be equalized; whereas, whilst some degree of diffusion was necessary, it was desirable to have one plane sharper than the rest, so as to secure better definition, to the marking of the eyes. A lens could be made which would perfectly render the markings of the iris of the eye, and at the same time define sufficiently all the rest of the head. At the next meeting he would bring before them an instrument which would, he hoped, aid in the progress of the art.

The Chairman, at the request of Mr. Claudet, read a letter from Voightlander, and one from Lerebour, complimenting Mr. Claudet on his method, and expressing high approval.

The Rev. J. B. Reade asked Mr. Dallmeyer if moving the back lens only did not introduce aberration.

Mr. Dallmeyer said it did.

The Chairman moved the cordial thanks of the meeting to Mr. Claudet. He said, no matter how diverse their opinions might be on the method proposed, Mr. Claudet could not fail to command their cordial thanks for the high tone of his paper, and the artistic feeling and good taste by which it was pervaded. Thanks were duly accorded.

The Chairman called attention to the specimens on the table, amongst which were some pictures by Mr. Robinson, Mr Hughes, and Mr. Mayland, by the new portrait and group lens very fine solar camera pictures by Mr. Mayall and by Messrs Holroyd, of Harrogate, some of the latter being carbon prints. He also called attention to an example of Ross's new actinic doublet, the largest hitherto made, covering 24 inches by 22 inches, having been made for the Belgian Government.

After a vote of thanks to Mr. Reade,

Mr. Wharton Simpson asked the Chairman if any arrangement had been made on behalf of English photographers contributing to the International Exhibition for sending over the pictures, or would each photographer have to send his own separately? Also, if an arrangement had been made to superintend the interests of English photographers in the hanging? At the Exhibition of 1862 a representative of the French Photographic Society attended to superintend the hanging of the pictures of French photographers. As the time for sending in was, he believed, next month, it was time some information were published.

The Chairman said the Society was not in possession of any information on the subject. It was a very desirable thing that such arrangements as had just been suggested should be made.

The proceedings then terminated.

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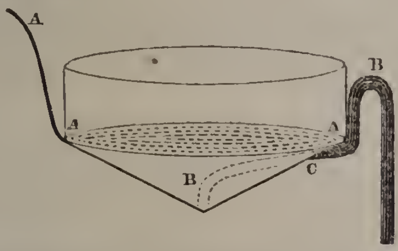
Correspondence.

A NEW PRINT WASHING MACHINE.

Sir,—I think the majority of photographers will agree with me when I say that there is nothing operates more against the art, in the mind of the public, than the evanescent character of our photographic prints. Very few, I daresay, have escaped replying to the query, "Will they change colour?" And if the reply is honestly given, it will be anything but satisfactory. Yet it is universally admitted that thorough washing is the remedy. That a thoroughly good washing machine is not "kept on the premises" of most photographers is obvious, if we examine the contents of the printsellers' windows.

I give below a diagram and description of a "machine" which I had constructed five years ago from "original designs." It does its work effectually and quickly; and if the permanency of the photographic print depends on thorough washing, I believe it capable of effecting the much-to-be-desired result.



The vessel is round, and made of zinc. It is 2½ feet in diameter, and 9 inches deep from the top to the false perforated bottom—which is movable, so as get the cone bottom cleaned out. A A A is a half-inch supply pipe going the whole round of the vessel on the top of the perforated bottom. This pipe is of India-rubber, and small holes are cut, to make the water play in every direction. This keeps the water, when above the level of the false bottom, in constant motion. B B B is an inch syphon, the mouth of which is placed as near to the point of the cone bottom as possible. It comes to the outside of the vessel at the point C, so that the space occupied by the prints may be kept clear for their uninterrupted motion.

It will be seen that the vessel will fill and empty itself every few minutes. The hypo. being heavier than the water, will fall into the cone bottom, and be *completely* carried away before the new water again rises to cover the prints, leaving each new water minus the whole of the hypo washings of that which preceded it. It will be apparent that prints subjected to this treatment for a couple of hours will be far more effectually washed than if they lay twenty-four hours in a vessel through which a current merely passed, leaving nine-tenths of the hypo at the bottom, with the prints on the surface packed in one mass, secure against any power the current may exert from below. Prints once placed in the vessel shown above cannot "clog" together, for even while they lie on the perforated bottom the water from above plays upon them, keeping up (unless the quantity of prints be very large) a continual stream.

Any plumber will make a machine of the dimensions given for about 7s. 6d.

Trusting that the subject may seem of sufficient importance to command a place in your valuable paper, I am, sir, your obedient servant, J. M. Young.

25, *Brunswick Street, Ryde, I. of W., 28th October*, 1866.

Photographic Notes and Queries.

Measuring the Equivalent Focus.

Sir,—I would like to know if the method employed by M. Mathiot in the reduction of maps, which is mentioned in your number of the 12th of October, is the same as that which was proposed by Mr. Claudet some years ago for the enlargement of photographs by the solar camera, and which, if I recollect well, was very simple and correct, although I have forgotten the particulars of the process. Perhaps you will be kind enough to give me the description of Mr. Claudet's method, for which I shall be very thankful.—I am, sir, yours truly, An Amateur.

50, *Bolsover Street, Marylebone Road.*

[Perhaps Mr. Claudet will oblige our correspondent, and our readers generally, by a re-statement of his paper, which was, we remember, an able and important one.—Ed.]

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Talk in the Studio.

New Mode of Imparting Solubility to Resins.—M. Vieletto found, some time since, that Calcutta copal and its congeners, which form the foundation of varnishes, and which are not naturally soluble in spirits of turpentine, benzine, petroleum, and other hydro-carburets, or the vegetable oils, become so, with, and even without, the application of heat, if they have been previously subjected to it, so as to lose 25 per cent. of their weight. He has recently discovered that they are rendered soluble in the above-mentioned fluids without losing any of their weight, if they are heated in close vessels to a temperature between 662° and 752° Fahr., and then cooled, forming excellent varnishes. And a varnish suited for the most delicate purposes may be made by heating to the above-mentioned temperature a mixture containing Calcutta copal, one-third of its weight boiled linseed oil, and four-thirds spirits of turpentine. There is no loss of weight during the operation. In these cases the effect is due to both heat and pressure. The latter amounts to twenty atmospheres, which may be a source of difficulty in the industrial application of the new process.

Economic Production of Benzine.—M. Bobouf has greatly simplified the process for obtaining this important substance. He merely treats coal-tar with caustic soda, at ordinary temperatures, and thus dissolves the heavy oils which it contains. The benzine, which floats on the surface of the solution obtained, is separated by decantation, and rectified. This simplification of the mode of producing benzine will have the important result of lowering the price of aniline and picric acid. The combination of alkali and tar, which is a kind of soap, and is termed by M. Bebeuf phenate of soda, is considered by him as a compound which will be found of very great utility in medicine, industry, and agriculture, possessing, as he believes, all the properties of phenic acid.

Photography as an Agent of the Police.—The police of New York, as well as of many other cities, find photography to be a very valuable assistant in the detection of crime. In New York there is a well-appointed photographic establishment connected with the police department, and the operator—who, by the way, is a policeman—is constantly kept busy. All the pickpockets, shoplifters, and other habitual criminals, as soon as they are arrested, are obliged to sit for their pictures. Copies of the photographs are made, and so used that the members of the detective corps become familiar with them. It is possible, by means of the photographs, for one who has never known a pickpocket to learn how to point them out at sight. Photography has now become one of the most important and certain agencies for the detection of crime. We give below, as an illustration of the use of photography, a case which has just come to our notice. It appears that during the afternoon of the 26th ult., a young man, accompanied by a female, left the New York boat at Albany, and entered the dry goods store of Mr. Armstrong, on Broadway, and priced several pieces of silk, but they made no purchases. After their departure the salesman discovered that three pieces of silk had been abstracted. The Albany police were apprised of these facts, but they could not gain any trace of the supposed thieves. On Saturday, Inspector Carpenter, of the

Metropolitan police, had occasion to visit the State Capital on business, and took with him a complete set of the photographs taken of notorious thieves under his direction. He learned that a robbery had been committed, and suggested that a clerk in the store which had been robbed be sent for, which being done, the photographs were submitted to his inspection, and resulted in his recognizing the portrait of Albert Nellis, a well-known shoplifter, as the man, and also identified the portrait of Maria Stewart—Nellis' "Moll," or helper—as the woman. This was so satisfactory that Mr. Carpenter ordered the arrest of both Maria and her partner, and on Thursday Nellis was secured and sent to Albany. On his arrival there the clerk readily pointed him out from among a number of strange men as the suspected thief. Maria has since been arrested and forwarded to the State Capital. These prisoners have been frequently in custody on similiar charges, but have always escaped prosecution by returning the goods stolen.

New Application of Magnesium.—The Magnesium Metal Company have prepared bars of absolutely pure magnesium for replacing zinc in the detection of arsenic and poisonous metals. The *Chemical News* says:—"We have submitted them to experiment, and find that they perfectly answer the object in view. Tested in Marsh's apparatus, we have not met with the faintest indication of anything which could simulate the appearance presented by arsenic. Chemists, who have been in the habit of working with even the purest zinc ordinarily obtainable, will appreciate this new application of magnesium."

A Photographic Sunset.—We have been favoured by Mr. Sampson, of Southport, with a very fine 10 by 8 print of a recent sunset over the sea, in which the clouds are massed in unusual splendour, the bit of foreground, water, and sunset clouds forming a very fine composition. It is printed a thought deeper and toned slightly blacker than is necessary, we think, to do justice to the subject; but is a very charming picture notwithstanding.

Yorkshire Fine Art and Industrial Exhibition.—Our attention has been called to an omission by our correspondent in giving the list of photographic awards at the Exhibition. On reference to the catalogue we find that Mr. G. Hare, of Lower Calthorpe Street, received a medal for excellence of workmanship in photographic cameras and apparatus.

Papier Leptographique.—Mr. P. Taglis writes to the effect that, some time ago, a parcel of this paper arrived in the establishment where he was then engaged, and from examination and experiment he came to the conclusion that the paper was prepared with collodio-chloride of silver. He believes that the developed and transferred collodion prints will be more certainly permanent.

The Athenæum and Photography.—The *Athenæum*, inserting and commenting upon a letter sent to them by Mr. Frith, on the allegation of retouching-in the series of photographs named, says: "We did not suppose that the 'copies' themselves sent to us were 'touched;' there are other and cheaper ways of sophistication in photography than that of employing an artist to work on every positive which is sold. Neither did we fancy that the negatives which directly supplied these 'copies' had been 'touched.'" At first glance this disclaimer and insinuation seem intended to mystify rather than explain. But on second thoughts it occurs to us that the critic has probably heard of a process sometimes practised in reproductions of paintings, namely, the production of a negative from a carefully retouched print. If this be the meaning of the insinuation as to "other and cheaper ways of sophistication," it is equally incorrect as any other surmise. The pictures criticised as so sadly worked upon were from negatives direct from nature, and no form of sophistication has been used in connection with them. Whilst referring to this subject, we may mention that whilst many charming pictures of the series are from Mr. Frith's own negatives, they are not exclusively so. One very exquisite picture noticed in our last, which reminded us more of a drawing by Pyne than anything else—the "Belfry, Bruges"—is, we understand, from a negative by Mr. Stephen Thompson.

To Correspondents.

A Subscriber asks us to describe for him the simplest mode of enlarging from the negative, with mode of preparing the paper, &c. We would willingly oblige a subscriber, but how can we possibly describe efficiently such a process in this column? If "Subscriber" has also been a careful reader, he must have seen a considerable number of articles on the subject of enlarging in our columns from time to time, and there is still much to say on the subject. There are two distinct modes of enlargement: one consists in first producing a transparency as well defined and full of detail as possible, and from that an enlarged negative, from which prints may be obtained in the usual way; the other method consists in using the solar camera, either printing by development after a few seconds' exposure, or printing right out after about an hour's exposure. If our correspondent will indicate which of the methods he would like to try, we will refer him to articles giving him details of manipulation.

A Two Years' Reader.—The magic photograph you enclosed is printed in the usual way and fixed without being toned, well washed, and then placed for some time in a saturated solution of bichloride of mercury, which bleaches out the image, leaving the paper white. A piece of blotting-paper which has been immersed in a solution of hyposulphite of soda and dried, accompanies the print, and when this is moistened and placed upon the invisible image, it at once becomes visible by the formation of sulphide of mercury. The method has been described several times in our pages during the spring and summer.

G. P. W.—No. 7 is one of the best; any of the others are as good as No. 6, and some better. The parcel shall be sent. The stereos are good. Thanks.

C. J.—The terms "ceramic colours," "enamel colours," and "vitreous colours," all indicate the same thing, and describe certain bodies which, on being submitted to a great heat, become vitreous, like glass and porcelain. They consist chiefly of certain portions of powdered glass, flint, borax, &c, forming the flux; and certain metallic oxides, forming the colour. You will find details on pages 587 and 663 of our Fifth Volume. 2. The removal of the collodion film which supports the image from the glass to the enamel tablet, is a matter of skilful manipulation. 3. The collodion film is dissolved either by ether and alcohol or wood naphtha. 4. The heat will vary with the materials used; but will vary from a bright red heat to a white heat. The enamels are quite a red heat when removed from the muffle.

Lux et Salus.—The photographs are exceedingly good. We shall have pleasure in receiving the promised communication.

Opal.—There are many modes of producing pictures on opal glass; but the simplest is by the collodio-chloride process, which we have often described. You will find full details in our last Year-Book.

G. M. R. (Torquay).—We cannot speak from much personal experience of the results of the ferridcyanide and uranium intensifier; the negatives we intensified we found to remain perfect, and we have heard some good accounts of it; but in one instance we have heard of the negatives spotting during printing; whether this is due to the process or other causes, we are unable to say.

John Turnley.—Some difference of opinion prevails as to the action on the nitrate bath of a preliminary coating of albumen on the plates. In some cases, we know fog ensues; in others, we have been told that if the albumen be very dilute, about one part of white of egg in eight of water, with a few drops of acetic acid, no bad result follows. Perhaps the safest plan is to coagulate the albumen by immersion in a bath of sulphate of iron; rinse thoroughly, and then dry. This plan has been successfully used by Mr. McNab, of Glasgow.

G. B. S.—The card which you enclose, which is so lamentably spotted, appears to have been subject to some especially injurious conditions. Where has it been kept? Are other photographs by other artists, kept under similar conditions, similarly injured? We shall be glad to learn.

Kent.—The chief fault in the pictures is a slight lack of brilliancy, arising apparently from too much diffusion of light; a more strong and concentrated light on one side would be an advantage. Your group lens will be decidedly slower than your 2 B, and will perhaps, in a dull light, be too slow for convenience; but the latter will require the use of a stop to make it cover sufficiently. With the latter, it will be wise to keep the figures small. Of those sent we decidedly prefer No. 7. You cut the print a little too small, and thus make the margin of the card a little too wide. It is desirable to have the mere line of margin customary in mounting cards, or else a decidedly wide margin.

B. B.—The pictures are exceedingly fine illustrations of the excellence of the Gordon process. When you are prepared to state details of your manipulations, we shall be glad to receive them. The ivy-house, in which both halves are from the same negative, does not, of course, possess stereoscopic relief, but we see no fault of this kind in the others; although, in some instances, the result would have been better if the two halves had been more nearly identical as objects included. Regarding the use of cyanide, we shall be glad to receive your communication. We can only at any time publish what we know.

W. Monkhouse.—The water agitator has arrived, and shall be duly noticed. We shall write to you shortly. We shall have pleasure in seeing you when you are in town.

R. M.—See Report of the Photographic Society. We have no definite information as to time of sending in, or indeed anything else regarding photographic contributions to the Paris Exhibition. Unless exhibitors make some specific effort to look after their own interests, we fear that there will be some disappointment eventually.

L. D. R.—The best cure for a thin, blue film, is the addition of a little more soluble cotton to the collodion. Sometimes the addition of a little more iodide is necessary, but not often. If the collodion fog from being new, a few drops of tincture of iodine will sometimes remedy the trouble. The print is very good.

M.—Mr Swan has not yet made any public announcement of his intention regarding his patent; but we believe that he does not intend to place any restriction on the practice of the process; but merely to reserve the right of making the tissue. The fact of photographers being thus enabled to purchase carefully-prepared tissue will be a boon rather than a burden.

F. P.—It has been possible, for many years past, to produce photographs in natural colours, but not to fix them. We see no probability of a practical solution of the question at present. The paragraph from *Galignan-* merely referred to some recent experiments by M. Niepce de St. Victor in a direction he has long worked. The matter was fully described in our pages at the time.

Charles Taylor and several other Correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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THE INTERNATIONAL EXHIBITION OF 1867.

English photography at the French International Exhibition is threatened with failure. A general feeling of anxiety prevails amongst the photographers intending to contribute, and a number of enquiries are continually reaching us, to which, we regret to say, we can only return much less than satisfactory answers. Correspondents ask, When is the latest time for sending in our pictures? Shall we have to send them direct to Paris, or will some agent in London take charge of them? Will the hanging of English pictures be under the control of an English committee, appointed to take charge of our interests? We fear that they have more reason for anxiety than many of them imagine.

At the last meeting of the Photographic Society we put some questions on these subjects to the chairman. We scarcely expected to obtain any information, for no one seems to know anything at all about the matter; but we felt that it was desirable that such questions should be publicly asked. The chairman agreed with us in the importance of the matter, and especially that it was desirable that the interests of English photographers should be personally represented during the hanging; but he could give us no information on the subject. Subsequently, it was privately suggested to us, by several intending exhibitors, that it would be well if all concerned should form a combination, and, by means of a subscription amongst themselves, send a duly accredited representative to Paris, to look after the interests of English photographers. At the International Exhibition in Hyde Park, in 1862, the contributions of French photographers were hung under the superintendence of M. Laulerie, the Secretary of the French Photographic Society, who was sent over for the purpose. This circumstance might naturally be thought a precedent for a representative of English photographic interests at the French Exhibition. We fear, however, that no such precedent will be regarded.

We now proceed to give all the information we have been able to obtain on the subject, by enquiry, since the meeting. The Exhibition will be opened on the 1st of April, 1867. The period for sending in goods, as originally announced (and we have heard of no officially announced change), is from the 15th of January, 1867, to the 10th of March; everything to be unpacked and arranged before the 28th; the 29th and 30th being reserved for a final general cleaning, and the 31st for a review of the Exhibition preparatory to the opening. We have heard a rumour, repeatedly mentioned, to the effect that photographs were to be sent in by the 15th of December. This has probably arisen from the fact that an announcement was published to the effect that French photographers would be required to send in, at an early period, proofs of their intended pictures, which would be submitted to a sort of censorship, in order that unworthy work might be rejected. In reference to French photography, the following announcement has been published:—1st. That painted or retouched prints will be refused, unless they show real artistic merit. 2nd. That the final prints ought to be sent in from the 1st to 15th of February, 1867. 3rd. In regard to those persons who have asked for a larger space than has been provisionally accorded to them, it is stated that until after the 15th of December the jury will not have finished their work, so they will be able to reply to them.

Intending exhibitors have already received proof slips of the entry in the catalogue concerning them. The amount of printed space accorded was so small as in many instances to be absolutely useless. For instance; the exhibitor's name, and the word "photographs" placed after it, could convey no possible information in regard to prints which were only exhibited as curious scientific results of some novel process, and which the producer would never dream of exhibiting as pictures. We are glad to be able to announce that a modification of this arrangement has been conceded, and photographers will be permitted to attach a description to their entry in the catalogues, but not exceeding fifteen words.

Regarding the packing and carriage, we regret to say that no arrangements have been made, or are likely to be made. As matters at present stand, each exhibitor must transmit his own contributions, and, as at present appears, have an agent at the Exhibition to receive them. We republish here the originally-issued condition referring to this question, which, so far as we know, has not been in any way modified:

> Art. 39.—The cost of packing and carriage of the goods sent to the Exhibition, and of the goods which have been exhibited there, is to be borne by the exhibitors, both to and fro.
>
> Art. 41.—The Imperial Commission will not interfere in any way between the contractors for the carriage of packages and the exhibitors in respect of the despatch and the reception of the goods.
>
> The exhibitors must, therefore, either personally or by their agents, see to the transmission and reception of the packages, and verify their contents.
>
> If neither the exhibitor nor his agent be present to receive the packages on their arrival at the Exhibition, the carrier is bound to remove them immediately.

Now, it appears to us, that if these conditions are to be carried out, and no general agency for the purpose of taking charge of English photographs be established, the matter, so far as English photography is concerned, becomes at once a dead letter. How is it possible for individual English photographers to find out trustworthy agents in Paris, who shall be waiting to receive their pictures as soon as they arrive at the Exhibition building? How can they be expected to charge themselves with the expense of employing such agents, as well as preparing specimens for exhibition, packing them, and repacking and bearing the cost of carriage both ways? Commercial advantage, as a rule, they can receive none: their chief motive in contributing must be the desire to see English photography properly represented; but they surely ought to be permitted to do this with reasonably available facilities, and at reasonable cost. That there may be no mistake on the subject, the same conditions are repeated in subsequent articles, which we quote from the official announcement:—

> Art. 47.—All other [meaning except steam, water, &c., for motive power] expenses, such as the employment of workmen in the building, the reception and opening of packages, the removal and charge of packing cases, the construction of counters, stages, glass and other cases, &c., the placing of goods in the Exhibition building and in the park, the decoration of the stalls, and the return of the goods, are to be borne by the exhibitors, French as well as foreign.
>
> The Imperial Commission will point out to exhibitors who may apply, contractors for the execution of their work and for the removal and custody of their cases; but they are at liberty to employ any contractors or workmen they may think fit.

But here is another discrepancy. Here it is emphatically laid down that exhibitors are to take charge of the placing of their goods in the Exhibition; but on enquiry as to the possibility of English photographers appointing, amongst themselves, a representative to superintend the hanging, and to take charge of their interests, we are informed that such an arrangement could not be recognized. It is intended, we understand, to hang pictures and photographs with a view rather to the effect of the *tout ensemble*, than to secure any aggregation of the works of individual photographers. The answer we receive is, in general effect, that no interference of any kind will be permitted; that the authorities prefer to please themselves.

Perhaps this is very natural: perhaps it is right. But it is surely time that some definite information, beyond the original general conditions, should be accorded to photographers. If the conditions, as we have quoted them, be adhered to, and are not supplemented by the appointment of some special agency, we predict that a large portion of the English photographers intending to exhibit will take no further steps in the matter, and the representation of English photography will be a failure.

It appears to us that necessary arrangements might be made very simply. Let an agent in London be appointed to receive all the packages of English photographers, and send them in one consignment to an agent in Paris, who will superintend the unpacking, duly registering and taking charge of the cases, repacking, and despatching to their owners. This would be attended with much less expense than would be attendant on individual effort. It may be done by official action; if not, it should be done by private combination amongst those concerned.

The question will be asked, Is photography officially represented in any way? We fear not. The arrangements for the English department generally are in the hands of the South Kensington authorities, who have a reputation for both circumlocutionary and autocratic procedure. For certain purposes—the allotment of space, for instance—the aid of the Photographic Society was invoked; that aid rendered, they are no further consulted, nor even supplied with information. It appears to us that unless photographers concerned bestir themselves, and either secure official action or resolve themselves on some combined action, they will find themselves, at the eleventh hour, left out in the cold.

At the moment of going to press we have received the following communication on this subject from a trustworthy source:—

Paris Exhibition.

It is understood that the Science and Art Department of the Government, to whose hands the management of the British portion of the Exhibition is entrusted, will ask the Council of the Photographic Society to nominate some competent person to hang the photographs. The precise date for sending the photographs to Paris has not yet been fixed; but exhibitors will receive due notice of the time fixed. No plan of the space allotted will be sent to exhibitors, as it may not be found possible to hang the photographs of each exhibitor together.

THE "LEPTOGRAPHIC" OR COLLODIO-CHLORIDE PAPER.

Nothing is more perplexing to the practical photographer than the statement of diametrically opposite results from similar experiments. When different opinions are expressed by different authorities, the value of the opinion will be determined by the weight of the authority; but when the same experiment is described by two persons, and the results are directly opposite, it is at least a little puzzling. About a month ago, our Paris correspondent, M. Lacan, Editor of *Le Moniteur de la Photographie*, first acquainted English photographers with the advent of a kind of sensitive paper, the virtues of which were proclaimed with great circumstance by a Spanish firm. The preparation of the paper was stated to be a secret, but it was intimated that collodion was the base of its preparation. Shortly afterwards, M. Gaudin, Editor of *La Lumière*, examined the paper and its results, and expressed his conviction that the paper was prepared by our collodio-chloride of silver process. In the meantime, two or three of our correspondents, who had examined the paper, communicated to us a similar idea, stating that the paper and the pictures alike justified this conviction.

When the first examples of the pictures reached us, two or three weeks ago, we saw at once that they possessed all the special characteristics of collodio-chloride prints on paper; and on applying a solvent of collodion, we found the surface at once dissolved. We were a little surprised to hear an incidental account of an attempt to dissolve the surface by means of ether and alcohol, which, it was stated, had no effect whatever on the picture. We have since seen, in a contemporary, the extraordinary statement that an hour's soaking in a mixture of equal parts of ether and alcohol failed to dissolve the surface,* and a conjecture is added that it consists of some modification of soluble glass. In the same article it is stated that when the whole superficial film was removed in one unbroken sheet by the aid of alternating hot and cold solutions, no trace of any image could be seen on the paper upon which the film had rested.

Our own experiments yield diametrically opposite results. The especial print upon which we operated was one by Mr. Bingham, of Paris, produced upon the specimen paper (matt surface) sent out by the Leptographic Company. The picture was delicate and fine, but scarcely sufficiently deeply printed. We first poured upon a portion of the print a little methylic alcohol, or wood naphtha, an excellent solvent for pyroxyline. The portion upon which it was poured in an instant dissolved, taking with it, on pouring off, the greater portion of the picture; but leaving at the same time on the paper a distinct grey image of all the shadows. Its behaviour was precisely the same as that of a collodio-chloride print on a non-absorbent paper, and the image left behind was similar to that found on the collodio-chloride print after the collodion is removed. We next tried another portion of the same print with a mixture of ether and alcohol. The film was not so readily acted upon as when the wood spirit was used; but in about a minute it dissolved, also leaving a faint image on the paper, as before. The experiment is a simple one: let any one try it for himself.

A word or two on the behaviour of dried collodion films, in some circumstances, under the action of solvents. It will frequently be found that a dried collodion film is much less soluble than a sample of the pyroxyline from which it was made. This is at times the case when the film is on paper, especially the case when it is in contact with gelatine. The surface of a print enamelled by means of a film of gelatine covered with a film of collodion often resists the action of a solvent for some time. In all such cases wood spirit will be found most valuable; indeed, we know of nothing which will more readily remove the dried film from old negatives, whether varnished or unvarnished, than wood spirit. Mr. Joubert mentioned to us, some time ago, that he found it very difficult to dissolve the collodion film, after transfer to the enamel tablets, which had originally supported his image, composed of albumen, honey, oxide of chromium, and ceramic colour. It was necessary to remove the collodion film, which covered the transferred image, before placing the picture in the fire; and he found that it resisted the solvent action of ether alone, or of a mixture of ether and alcohol. We suggested wood naphtha as a more powerful solvent, when Mr. Joubert told us he had already tried it, and found it the only efficient solvent of the dried collodion film. We mention this fact as illustrating the possibility of a dried collodion film, under some circumstances, resisting for a time the action of ether and alcohol, although yielding to a more powerful solvent, a fact which might not be known to persons unfamiliar with such experiments.

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* Since the above article was in type, we chanced to be in conversation with a gentleman who had seen the result of the experiment described in our contemporary, and from his description we at once see the origin of the erroneous conclusion. The experiment was conducted, not with a print, but with a piece of the prepared paper, that with the glazed surface being selected for the experiment. This, consisting of the sensitive collodion film resting on a glazed or enamelled surface resembling the ordinary enamelled cards, presents very little difference in appearance before or after coating with collodio-chloride. After soaking in ether and alcohol, and dissolving the collodion, the glazed surface of the paper would remain uninjured, hence the experimentalist concluded that no action had taken place. It appears to be simply an error in observation.

On the leptographic paper and its connection with the collodio-chloride process, we shall probably have more to say at a future time. We are glad to find, in the meantime, that the process, under its new Greek name, finds more favour in a contemporary than it did under its original name. In reference to one very natural question, as to how the keeping qualities in the prepared paper are secured, we can at present merely offer a conjecture. We have found that collodio-chloride of silver applied to Brinckerhoff's waterproof paper gave excellent prints, and kept upwards of a week without change; we did not try it very long, but no change occurred so long as we kept it. This paper, it will be remembered, is prepared with a mixture of gelatine and kaolin, or similar substance, rendered insoluble by means of alum. The paper sent out by the Leptographic Company appears to us to be very similar to this, and, coated with collodio-chloride of silver, would be non-absorbent, and keep well. It is a little mortifying to ourselves, after spending some months in perfecting a process, and then giving it freely to the public, to have reason to believe that others are not merely making that profitable use of the matter which we renounced, but are, moreover, doing it without any acknowledgment, issuing it as a secret process, under a new name. Nevertheless, if the photographic public are eventually benefitted, we are satisfied. We have faith in the process and its results. We believe it will give more delicate pictures, and with less trouble, than albumenized paper; and if not absolutely permanent, as we fear no silver printing process can be, we believe that the prints will possess a longer tenure of existence than most of those produced by the ordinary method of printing.

PHOTOGRAPHS IN NATURAL COLOURS.

Nearly two years ago, rumours reached the photographic world to the effect that a gentleman residing in Mauritius, M. Chambay, had absolutely discovered a simple, certain, and practical method of producing photographs in natural colours, and that he was about to remove to Paris to introduce this method to the world. Some time afterward, an article appeared in the *Revue Contemporaine*, by Dr. Mantucci, extolling the results which he had seen, as resembling the finest miniatures; but expressing fear, alas! that it would be impossible to produce such results by light in a climate less favourable than the sunny south, in which M. Chambay's experiments had been made.

The best information we could obtain in answer to enquiries was vague; but we were led to understand that, instead of a process of photographing in natural colours, the rumour only referred to a method of colouring the photograph so that it had the appearance of having been produced with the tints of nature, no traces of pigment or manipulation being perceptible, as in the method of producing non-inverted coloured glass positives by transfusing the colour through a prepared collodion, by means of a "penetrating varnish."* As no further account of M. Chambay's operations appeared in the French scientific journals, we thought the matter was one of those *canards*, so common in relation to photography in colours, which are soon forgotten. Once more, however, we hear of the matter from the outside press, and this time with much circumstance. The Paris Correspondent of the *Morning Post*, in a recent letter, states that he has not only seen results, but has investigated the process, which he pronounces a great chemical triumph. How is it our photographic contemporaries in Paris tell us nothing of this? Whether *canard* or fact, it would be interesting to know what it means. Here is the statement from our morning contemporary:—

Photography in Paris is making wonderful advances. We have an annual exhibition of the photographic productions of France, Germany, and England, in the large exhibition building, Champs Elysées, in conjunction with the works of painters and sculptors. The student of photography here looks out each year for that long-desired and long-prophesied triumph of chemistry, the production of colour; but we have not yet met with it in these vast collections. The honour of producing on paper the exact colouring which the human form throws on the camera has been reserved for M. Chambay, whose process I have carefully investigated, and am able to declare that he succeeds in producing a portrait which gives all the exquisitely varied tints of flesh, together with a transparency in the shades never before attained. This is a great chemical triumph. We have in Paris most admirable examples of tinted or painted photographic portraiture, but we have never yet got colour as well as form from the *chambre noire*. M. Chambay is at present almost unknown in his out-of-the-way studio in the Avenue Montaigne, and therefore I feel the more pleasure in recording this great chemical and art event of the day. For the first time I have seen photography doing justice to female beauty; and never did the human hand reflect flesh and texture of drapery with such wonderful exactitude. Henceforward the photographic artist possessing this secret has only to place his men and women in a graceful and intelligent attitude, and that which a looking-glass reflects will permanently rest on the paper. No attempt has yet been made by the artist to produce landscape, and it is with him yet a problem if colour can be held and printed after a certain distance. But one long-sought object has been attained, so far as portraits are concerned, and dates a new era in photography.

MONKHOUSE'S WATER AGITATOR.

We recently received a courteous invitation from Mr. Bedford to visit his establishment and inspect a modification in his arrangements for washing his prints, the working of which appeared to him more efficient than any he had tried. We found the arrangement as simple as it was efficient; its novelty consisted chiefly in the use of a clever contrivance by Mr. Monkhouse, of York, called a Water Agitator, the operation of which was to keep a constant agitation in the washing water and amongst the prints, which, without risk of tearing or injuring them, seemed to approximate, as nearly as such an operation could do, to an actual mechanical rubbing of the prints.

The main features of the plan of washing consist in the use of a large trough, with a perforated zinc false bottom about an inch above the true bottom. Attached to the pipe from which the water enters the trough is the water agitator. It consists of a water-wheel, which is driven round by the falling water. Attached to the wheel by a crank is a piece of sheet zinc about eight inches long by three inches wide; this serving as a kind of flapper, which, being kept in constant motion by the wheels, to which it is attached by a crank, keeps the water in a constant commotion. The rapidity of the motion, and the amount of agitation consequent, can be regulated by two things: the stronger the falling stream, the more rapid (other things being equal) would be the motion; but the fuller the trough, and the greater the body of water, the greater the resistance becomes. So that by keeping a rapid outflow, and consequently a comparatively small body of water in the trough, whilst a heavy stream runs in, a very rapid commotion can be produced. This is not generally necessary, and, with a moderate force in the incoming stream, and a trough full of water, the motion is sufficient to keep a constant, gentle agitation, which keeps the prints moving, and prevents them sticking together. The water-wheel and flapper are enclosed sufficiently in a kind of cage to remove any risk of the prints coming into contact with them, and being torn. A syphon, of sufficient capacity to allow the water to escape sufficiently rapidly, is attached to the bottom of the trough:

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* See Newman's "Harmonious Colouring Applied to Photographs.

The use of a perforated false bottom is now very generally adopted in washing-troughs, its value being obvious. whilst the hyposulphite solution—being denser than water—will gradually sink to the lowest part of the trough, the prints, by means of the perforated false bottom, are kept above this lowest and most contaminated stratum.

On enquiry, we found that in Mr. Bedford's establishment no bad effects had been found from the contact of the prints with this perforated zinc, which was not varnished or protected in any way. The first day or two of its use, the prints which lay on the zinc were found to be marked with the design of the perforation; but this was found to be due to some dressing used in the manufacture of sheet zinc, and not to any action of the zinc itself. The prints received a good rinsing, after leaving the hypo, before entering the washing-trough.

Mr. Monkhouse supplies the agitator in its cage ready for use in any trough. It is not patented or protected in any way. and can be made by anyone; but it is probable that the inventor can make it better and cheaper than others. Mr. Werge, recently, noticing in our columns the Yorkshire Fine Art Exhibition, mentioned that the agitator there exhibited in motion did not seem to act efficiently. We are informed that this was due to the irregular supply of water at times when the ordinary pressure was lessened by the playing of the fountains. That we examined in Mr. Bedford's establishment kept the water in a very large trough in constant agitation from one end to the other, and appeared in all respects simple and efficient.

THE REASON WHY.

BY THE PHOTOGRAPHER'S ASSISTANT.

Cyanide of Potassium in the Negative Bath, etc.

A dose of cyanide a restorative to disordered negative baths! Nitric acid making more sensitive! Surely these are matters sufficient to set one's eyes staring on vacancy while the busy brain withdraws from its ordinary occupations to cogitate on the reason why of an apparently incomprehensible paradox, the most astounding of all existing photographic anomalies. Although admitting the existence of the interesting problem alluded to, I do not believe in paradoxical science. As such, a question might appear at first sight, but apparent contradiction becomes perfect harmony when the eye of reason is enabled to see clearly through the maze.

The best and only way to clear an entangled line is to commence at one end, never losing sight of that part until a completed clearance is effected. In like manner, all problems pertaining to science should be subdued. Vote me a bore if you please, courteous reader, yet will I insist that a paradox found hanging to the skirts of science should be at once removed; and the operation can only be performed by allowing the mind to begin at the beginning; to follow up the clue by the light of tested knowledge; to commence at its earliest dawn, making pre-existing theories serve as stepping-stones, which newly-found phenomena must either crumble to dust or aid in giving additional stability to the growing structure.

The strange vagaries played by the mischievous imps who preside over the fortunes of hapless photographers, seem in their most spiteful form to be directed towards the negative bath; giving birth to fogs, stars, comets, streaks, and other abominations which meet the eyes of the perplexed operator, whose agony is materially increased by the impatient ejaculations of an unusual array of customers who are clamouring to be "took off." Under such tormenting conditions many a photographer has danced to the music of unparliamentary language, "low, but deep," while his nervous fingers have scratched and scratched again, as if the reason why lay concealed beneath his curly locks

"Begin at the beginning." What are fogs, photographically considered? "It is a veiling of a perhaps otherwise perfect picture." Very good; but remember, this unbecoming veil assumes various forms. At one time it is found bedded in the collodion; at another it adheres but loosely to the surface of the plate—so loose, indeed, that a slight friction will remove it, and the picture is shown to be clear beneath. The causes of fogging, as first described, are numerous, yet all may be squeezed into one sentence of explanation:—Conditions which favour a simultaneous reduction of the free nitrate, when submitted to the action of the developer, cause that species of fogging which clings tenaciously to the collodion,—diffused light in the dark room, over-development or exposure, an alkaline bath, or fumes from some alkaline substance, a peep-hole in the camera, sometimes assisting to produce confusion. In each of these examples the imps would laugh at any attempt to poison them with cyanide of potassium.

The kind of fog which yields to the cyanide treatment may be readily known, as it belongs to the class of non-adherents before described. Now for the reason why. The water of which the bath is in part composed frequently holds organic matter in solution. Until the plate is under the process of development the fogging caused by this organic imp is not made visible. I am inclined to think that the acid set free from the precipitated silver reacts upon the organic matter, which assumes at once a visible form, mud-like in appearance, and tantalizing to behold. I am further strengthened in the opinion formed, by the fact that a bath containing organic matter, which yields tolerably clear pictures, will fog immediately if a drop or two of nitric acid be added (the action which occurs is too familiar to need further comment at this time). Happily, this last species of fog is the easiest to deal with. It can be easily poisoned by cyanide, or removed by carbonate of soda, &c., &c.; best of all, by a good shaking in company with kaolin. Again, for the reason why.

In a former paper I had occasion to remark that nitrate of silver is easily decomposed by various salts possessing alkaline bases, among which, at present, I need only mention cyanide of potassium. When either of the substances described is introduced into a solution containing nitrate of silver, an insoluble salt springs immediately into existence, which is diffused throughout the before transparent fluid. The particles thus formed remain for a brief instant in direct suspension, when the force of gravitation operates, and a copious precipitate moves slowly towards the bottom of the vessel, where soon accumulates not merely the newly-formed salt of silver, but also the organic matter before held in transparent solution. If cyanide of potassium or carbonate of soda has been employed, the bath thus treated is found alkaline—more especially if the last-named salt has been introduced—and as such gives rise to another kind of fogging, before described in example the first. A plate excited in such a solution, when exposed to light, secures a latent image with extra rapidity; but—paradox of paradoxes!—if under-development, the free nitrate does not at once reduce simultaneously, every symptom of under-exposure is made apparent, the highest lights and middle tints coming out readily. But where are the shadows? "Plenty of shadow, but no details to enliven them." The reason why at once suggests itself. The bath is alkaline, or borders on such a condition; not sufficient to give actual fogging, yet enough to produce veiled shadows. On applying the developer, the highest lights appear; but ere the shades can yield up detail, the free silver in these parts succumbs to the deoxidizing agent, and a film of reduced silver forms, which renders the latent portions of the partially developed picture powerless. The addition of nitric acid mends matters, but in so singular a manner that anyone might be led into the erroneous belief that the increase of detail made apparent owes its origin to increased sensitiveness derived from the addition of nitric acid. Hence, a paradox is started which makes photography a bewildering study. Allow me, kind reader, to observe, that the change wrought by nitric acid is owing to the increased stability it imparts to nitrate of silver, giving it increased power to withstand the action of the iron solution. Under these conditions the latent image is permitted to exercise its legitimate influence, and, instead of the silver intended to form the superstructure being reduced at a blow, it precipitates slowly, being gradually drawn down by the magnetic power beneath. Details in all their beauty appear, a perfect picture is formed, and lots of satisfaction follows.

Seeing that an addition of cyanide robs the bath of silver, why not employ kaolin, which effectively answers a precisely similar purpose? A correspondent wrote to me recently:—"The kaolin you recommended proved more effective than cyanide or anything else I tried."

It is only necessary to shake up a small quantity of kaolin with the bath; allow it to precipitate, then filter. Under this treatment the organic matter is removed, and no loss of strength follows.

Sometimes fogging, which resembles that produced by organic matter, arises from the bath being saturated with spirits. Boiling is the best remedy for this last disease. Place the solution into a wide-necked bottle, put a little water into a saucepan, and the bottle in the water. Let both warm, and finally boil together. While in a state of ebullition, place a lighted match to the neck of the bottle; a jet of blue flame arises to prove that your operations are not made in vain.

In conclusion, courteous reader, when you have read and digested the remarks I have now offered, judge whether I have not, to some extent, robbed a seeming mystery of its paradoxical character.

DIFFUSION OF FOCUS.

Mr. V. M. Griswold describes, in the *Philadelphia Photographer*, some experiments made fourteen years ago for defining objects widely separated, of which he is reminded by Mr. Claudet's recent paper. Upon the inner tube of the lens he had a graduated scale, and in the outer tube was an aperture in which a piece of glass was placed, which permitted the scale always to be seen. Focussing the various objects before exposure, he marked the amount of movement necessary so as to give the proper range of movement to the lens during exposure, obtaining some remarkable results, especially in groups. He says:—

> I adopted the plan of giving the tube a very rapid motion between the two points focussed; and, for the better purpose of securing this rapid motion, as well as to secure greater accuracy, I had planned an arrangement (first) for securing the camera in a firm, solid framework; and, next, attaching a weight, by means of a clockwork, to the tube, which, by being "tripped" at the moment of exposure and suffered to run down, would give the tube a rapid motion between any two points indicated upon the scale. The idea was also entertained of giving this motion to the rear lenses of the combination alone, and I only gave up these experiments at the time because I did not feel able to realise the plan for a clockwork attachment; and afterwards, becoming involved in other business operations, it was given up entirely, and not since thought of, until the recent articles upon the subject in the British photographic journals have revived my recollection of these by-gone experiments.
>
> One of the pictures I took at the time was a group of two persons, one reclining upon a lounge very much foreshortened; the second one standing behind and leaning over the lounge. In the rear of the group, at a distance of some five or six feet, was a small oil-painting hanging upon the wall. I focussed upon the two extreme points, viz., upon the little picture, and upon the feet of the reclining figure, which were the nearest points.
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> During the exposure I moved the tube as rapidly as I could, by means of the "rack-and-pinion," between these two points. The result was a picture remarkable, as regarded the true relation of parts, and even the little picture upon the wall could be distinctly made out; but there was a general blurring from causes above indicated, and also, probably, from the constant increase and diminution of the objects in the picture, unavoidable in such a movement of the tube, but which difficulties I hoped to overcome by the rapidity of the movement proposed to be communicated by means of the clockwork, and by securing the camera in a perfectly firm position. It is, manifestly, not a very plausible-looking theory, and a practical test might prove it to be entirely erroneous; but the success I met with was so encouraging, that my faith was strengthened that very remarkable pictures might be produced by such means, modified to suit unavoidable exigencies; and I still have faith that something really valuable and practical will grow out of the recent suggestions of Mr. Claudet.

ON HELIOCHROMIC PROCESSES.

The following extract from the proceedings of the *Académie des Sciences* will be read with interest:—

M. Chevreul, in communicating to the *Académie* the interesting note of M. Niepce de Saint Victor, on obtaining black tones in heliochromic processes, desired to call attention to the interesting experiments which had given that gentleman such conclusive results.

When M. Niepce first succeeded in obtaining black tones in the presence of other colours, he was so much interested in the subject that he proposed to M. Niepce a further investigation, to ascertain whether it were possible to obtain black or grey tones by exposing the sensitive plate successively to the action of two rays, capable of producing complementary colours. This experiment gave, as is well known, successful results. M. Chevreul next suggested to M. Niepce the advisability of ascertaining whether any effect would be produced on a sensitive plate by exposing to its action the interior of a cylinder which had been blackened; but in this case no effect whatever was produced, showing that the black surfaces had no power of radiation. The experiment with the coloured picture of the soldier, where one black and one white gaiter was reproduced, clearly demonstrates that there is a decided difference between the radiation of these two colours.

While acknowledging the importance of M. Niepce's investigations, which have been carried on in a most praiseworthy and disinterested manner, for the advancement of photographic art, and have earned for their originator a greater name in the scientific world, M. Chevreul considers that the subject has by no means been exhausted. In the reproduction of natural colours by photography, it should be understood that colours may be distinguished in two ways: with regard to their appearance when examined by the aid of chromatic circles, and likewise by the effect their radiation produces upon the molecular constitution of the sensitive plate.

With respect to the nature of the colours produced by these heliochromic processes, M. Chevreul states that they are for the most part far from being pure and well defined, and sometimes are merely the result of simultaneous contrast. Thus it is quite certain that a pure white has never been obtained, but many portions of the image appear so by contrast with others. M. Chevreul cited the instance of the white light observed in a coal-gas flame do a well-known illusion of the same kind, which, even at the present time, is incapable of explanation.

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PRINTING PHOTOGRAPHS IN VARIOUS COLOURS.

The Cyanotype processes of Sir John Herschel, which are to be found amongst the earliest recorded improvements and modifications which succeeded the advent of photography, have, it has often struck us, not received nearly the amount of attention they deserve, possessing as they do such multiplied capacity of application and varied character of result. At a recent meeting of the Manchester Literary and Philosophical Society, Mr. J. A. Gatty read an interesting paper "On a Process for Printing Photographs in Various Colours," which appears to be based on Sir John Herschel's experiments. It is recorded in the Transactions of the Society as follows:—

"My process is based upon the property possessed by ferricyanide of potassium, of forming clear solutions with certain metallic salts, producing insoluble compounds when the mixture is brought into contact with a deoxidising agent; the rays of the sun acting as such, a perfect precipitation takes place upon paper or other material prepared with the above-named solution. In producing the specimens sent herewith, I applied to the paper a concentrated solution, formed of equal parts of ferricyanide of potassium and nitrate of lead, having found the latter to answer very well, not only as a means of forming a precipitate, but also for assisting in the production of numerous colours. After drying the paper, it was exposed to the sun for about half an hour, and then washed in water in order to dissolve all the unaffected ferricyanide of potassium and nitrate of lead. I have noticed that the sun acts much quicker when there is a little moisture present. I have, therefore, placed a damp cloth between two or three thicknesses of paper behind the prepared paper. After washing, the photographic image remains behind as a pale greenish precipitate, easily transformed into various colours, as the following experiments will show:—

No. 1. (Blue.) Has been steeped in a weak solution of nitrate of iron for about ten minutes, and then washed in water.

No. 2. (Green.) Same as No. 1, but steeped in a weak solution of bichromate of potash after the nitrate of iron.

No. 3. (Reddish Brown.) Has been steeped in a solution of nitrate of copper, and then washed.

No. 4. (Brown.) Has been developed by steeping it in a mixture of weak solution of nitrate of iron and nitrate of copper.

No. 5. (Dark Brown.) Has also been treated with nitrate of iron and nitrate of copper, but containing a larger proportion of the former.

These few experiments will show that a very large number of shades may be obtained by using different salts and mixtures thereof in developing the photograph. A further series of colours may be obtained by destroying the blue with caustic soda, which, after washing, will leave behind oxides of iron and lead, which may be dyed with vegetable colouring matters.

"All the above experiments have been made about four years ago, which goes to prove that the colours are permanent. I hope shortly to be able to resume my experiments, and work the process out more perfectly.

"Mr. Dancer remarked that he had some prints (which were shown to the meeting) produced by Mr. Mercer in 1856, which appeared to be done by a process similar to the one just described, prussiate of potash being one of the substances used; but he was not acquainted with the details of the process.

"It was considered a useful process for certain purposes, and deserved more attention than it had hitherto received."

WHITE GUTTA-PERCHA AND INDIA-RUBBER.

The description of a method of working and modifying the colour of india-rubber and gutta-percha given in the following abstract of a specification of an American patent will interest many of our readers. The patentee of the process is Mr. F. Marquard, of New Jersey, U.S.:—

"The patentee directs that about two pounds of pure india-rubber, or other similar gum, be first taken and dissolved in about thirty-two pounds of chloroform; other solvents may be used, though chloroform is preferable. When the gum has been thoroughly dissolved in any properly-constructed vessel, the solution is charged with a strong caustic ammonia gas, or treated with a preparation of chloride of ammonium, though he prefers the use of the caustic ammonia gas to bleach the rubber or other gum operated on. When the gum has been thoroughly bleached, which is ascertained by frequent inspection and testings, the charging with the gas or bleaching agent is suspended, and the solution is removed to a boiler or other suitable vessel having an agitator in it, and then subjected to a washing process with hot water until the gum is entirely freed from the bleaching agent used. This is effected by a constant agitation of the solution by keeping the agitator in motion in the washing vessel. At the same time that the washing process is going on, the degree of heat in the boiler may be increased to about 176°, Fahrenheit to evaporate the chloroform from the gum, which, by means of any proper arrangement of pipes, may be led to a condensing vessel or chamber, where it may be collected, to be used over again as a solvent for the gum. It will be obvious that the distilling operation may be carried on by a subsequent operation to the washing process; but whether carried on simultaneously with the washing process, or by a subsequent operation, the object is the same, to wit:—First, to free the gum from the chloroform at this stage of the process; and, second, to save the chloroform for subsequent use by collecting it in a condenser as it evaporates from the gum. The product thus obtained from the distillation of the gum is then in the form of a froth, which is strained or collected from the solution, and then pressed and dried. It is then redissolved in a small quantity of chloroform to a consistency of a thick paste, and mixed with finely-prepared pure phosphate of lime, or carbonate of zinc, in such proportions as to give a body to it, and having the appearance of slightly dampened meal, in which condition it is subjected to pressure in hot moulds, to give coherence to it, and expel any excess of chloroform from it. With a sufficient degree of pressure this can be done at once, and the compound, after coming from the mould, may then be put in the lathe, or other mechanism, to be worked and shaped into all manner of forms and devices.

"It will be obvious that the articles thus formed would be white; but to make articles to imitate coral, pearl, enamel, woods of various kinds, and other substances, it is only necessary to mix any of the various coloured dry pigments with the compound at the same time of mixing the phosphate of lime with it."

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ON COLOURING PHOTOGRAPHS IN OIL.

BY J. GRASSHOFF.*

Till the great problem of producing natural colours in photography, either by chemical or optical means, has been solved, we shall be compelled to have recourse to the painter for our coloured photographs; and, inasmuch as it will be the aim of every artist to give these productions the greatest amount of permanence, the employment of oil colours will constantly be resorted to. It is my intention, in the following communication, to offer to my fellow-workers a few suggestions which, I trust, may prove of some little use, with regard to the method of applying oil colours, which, irrespective of their durability, possess many important advantages over other colouring processes. Many persons, who are good water-colour painters, are altogether unable to work in oil, simply from the reason that they are unacquainted with the principles of applying the colours.

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* *Photographische Mittheilungen.*

To produce a good coloured picture, a good photograph is essential. When a print is required for colouring, photographers are sometimes careless in its production, as they suppose the painter can alter or remove any defects which it may happen to possess. In this respect they are, to some extent, correct; the painter can touch up and improve, add or take away, many little details; but it will always be the finest photograph which yields the most successful coloured picture.

Large pictures should be printed on a rough paper, suitable for colouring, and only those which are so small that they would lose sharpness by so doing should be printed on albumenized paper. All prints must be toned to a violet tint. Cartes-de-visite, and pictures of similar size, are best mounted with fresh starch paste, on thick paper, and then glued on strong glazed cardboard; larger prints (measuring say, from 10 to 12 inches) must be stretched on a screen of fine canvas, care being taken in mounting that the starch paste is very uniformly applied, and that no air-bubbles are formed. The smaller pictures may be glazed, but not the larger ones. When perfectly dry, those pictures which have been printed on albumenized paper are treated with an albumen solution, consisting of one part albumen to four parts of water. This treatment, which is unnecessary for the pictures produced on rough paper, renders the albumenized surface capable of receiving the sizing solution. Glycerine is sometimes used for this purpose, but its employment is not so successful.

I have used many sizing solutions of different descriptions, but most of them possess disadvantages of some kind. Gum is too brittle, and the second application of it generally dissolves away the first, thus rendering the surface unequal, a defect which is very apparent when the oil colours have become uniformly dry. Gelatine renders the picture too glossy, especially in those parts where no colouring has been applied, as is frequently the case with the darker portions of the picture. Isinglass has less brilliancy, but it is too costly a material. The sizing solution which I have found the most successful was made from parchment glue; it has scarcely any lustre, it is not brittle, and by no means liable to crack. To obtain this glue, which is of a light yellowish colour, and somewhat resembles that used by cabinet-makers, I put into a porcelain dish a quantity of parchment cuttings, adding just sufficient water to cover them, and boil the same for about a quarter of an hour; the compound must be well stirred while boiling, and afterwards clarified by straining through a piece of fine linen. One pound of parchment cuttings, which may be purchased for eighteenpence, will yield sufficient sizing for forty pictures, say 9 inches square. It should be freshly prepared every two or three days, as it will not keep good for a longer period.

This parchment sizing must be applied uniformly and in a lukewarm condition to the picture, by means of a soft, broad brush. If the sizing be employed too warm, small bubbles are generally formed, which are broken by the application of the oil colours, and give rise to spots in the painting. Every picture must receive from three to six coatings, according to the consistence of the size. An excessive coating is of little consequence, but too sparing an application must be avoided, as the picture may become damaged if the colours penetrate through the sizing. At the same time, the sizing must not be applied too thick or too cold, as it then becomes set before it has been properly laid on, and the layers will be of unequal thickness. Each coating is allowed to dry thoroughly before another is applied, and every successive application should be laid on at right angles to the previous one. When the last coating has hardened, the sizing is fixed with a saturated solution of alum, which is applied with a broad camel-hair pencil over the entire surface, as often as it continues to be absorbed by the size. The surface is then allowed to dry, and the superfluous alum subsequently removed with a soft brush moistened in water. When the picture is again dry, it is ready for treatment with oil colours.

The reason for fixing the size is to prevent the liability of its being removed if at any future time the picture may be washed for the purpose of removing dust or dirt, and likewise to impart to the surface a roughness, which facilitates the application of the colours. The plan of varnishing the photograph with a thick coating of collodion before painting it, is an expedient which I do not recommend, as, irrespective of its glossy character, the collodion does not afford sufficient protection against the formation of spots on the picture when the oil colours are laid on.

(*To be continued.*)

PHOTOGRAPHIC PORTRAITS.

BY ROBERT BULGIN.

> " . . . . . . 'Tis as like you,
> As cherry is to cherry . . . "
>
> Shakespeare's 'Henry VIII.

It is stated by Addison, in one of his papers in the *Spectator*, "that, owing to the invention of printing, authors had a great advantage over artists, in being able to multiply their originals; or, rather, that they could issue copies of their works to any number they pleased, which should be equal to the originals themselves."

This author, with a most reasonable delight at the immense life given to general literature by the introduction of printing, seems not to have credited the fine arts with any hidden power—nothing beyond that of producing originals. In his philosophy, he had not dreamed of the further exposition or development of the imitative art, or of new fields of artistic labour not yet turned up in any age or country; he had not foreseen in any bright prophetic vision the future of improvement and perfection in the art of which it had been finely said, "the past are kept in lively remembrance, and the present are insured immortality."

The idea of imitation appears to be natural to man. It was the desire to imitate which led him originally to trace roughly in outline the objects which most attracted his observation. As time passed on and an acquaintance with the fine arts became general, this idea and love of imitation gave birth in the ancient masters to the finest conceptions and representations of animate and inanimate nature, to landscapes, to battle scenes, to sea views, to fruit, and to flowers.

Though all these works of genius vastly pleased the imagination and gratified taste, the artist's magic influence was at its greatest height when the object copied excited ideas of reverence or affection. It was, therefore, soon found that to warm the mind with sentiment, or touch the heart with sympathy, man, or his lovely companion, woman, their relatives or friends, must be the objects imitated.

Up to the beginning of the present century, this balance of advantage which Addison claimed in favour of authors by the universal diffusion of their works, and the consequential improvement of society, remained where he left it, though the condition of things has since very materially changed. The foundation of a fresh dynasty having been laid by the invention of photography, an entirely new artistic race have sprung up, whose aptness in catching a likeness, and the quick method they have of producing personal portraits, and family groups, and varied scenes, with such astonishing exactness, draw them prodigious business, bidding fair to recover for the artist his original equality with authors. In fact, it may be said of both, that they have no limits to the extent of their productions beyond the encouragement and support of the public.

Looking at the question from one particular standpoint, the photographic artist possessss a natural advantage superior to the man of letters, the evidence of which is presented to us in our every-day experience. To receive an impression, or to derive the least degree of intellectual improvement from a book, it is necessary both to read and reflect; while to everyone blessed with sight, the impression conveyed by a likeness is caught at a glance without the deductions of reason. It appeals instantaneously through the eye to the mind and heart. It may speak a truth which not even the most illiterate can misunderstand. It may preach a sermon which will convey all the instruction without the weariness of words.

> "'Twas not by words Apelles charm'd mankind."

Photography is at once an art and a science,—an art, as it enables one to draw and depict by means of light; a science, as it teaches how to observe and investigate the effect produced by light upon all natural bodies.

The earliest germ of this delightful art was contained in a communication sent to the Royal Institution of Great Britain, and inserted in their journals for 1802. This paper was entitled "An account of a method of copying paintings upon glass, and of making profiles by the agency of light upon nitrate of silver."

Like many other ingenious inventions, it did not receive at first its due meed of appreciation. New ideas are always suspected, and usually opposed, without any other reason than because they are not already common.

The originators of the paper referred to patiently waited their time, having been satisfied by practical experience of the value of the discovery, and could not believe it would be lost because it did not immediately secure attention and produce results. It slumbered for a time, until about the year 1839, when the whole artistic and scientific world was startled by the public announcement, that objects could be made to draw their own pictures with an accuracy, minuteness, and celerity unattainable by hand.

The art was of a novel and unprecedented complexion, and as superior pleasure was happily blended with novelty, the union constituted a sufficient warrant for its introduction, as it also became the secret of its great success.

Photographic portraits having been produced, and public inspection solicited, the invention very rapidly acquired for itself popularity in the highest quarters. Her Majesty the Queen encouraged it. The members of the Royal House very liberally support it. In every family throughout the kingdom the art finds patronage, ensuring to it ultimate perfection; for wherever genius is displayed and meets with generous support, it is not too much to say, that any branch of art, or science, or manufacture may reasonably be expected to arrive at the greatest degree of perfection; while to look for such attainment before either has become an object of national attention would not be less absurd than the expectation to reap without having previously prepared the soil and sown the seed. If the world expect to see perfection in art, it must have a supporting hand hold out to it; if success is desired, there must be the necessary steps taken to secure it.

As a nation, perhaps there is no other which delights so much in possessing their own with their relatives' and friends' likenesses, as the English. This fondness for portraits may be attributed to our national good nature, or to the beautiful and noble faces abounding throughout the kingdom, or to our general encouragement of artistic productions and exhibitions.

The opinion Dr. Johnson maintained upon the subject of portraits is as orthodox as when it was first produced. He says, "The art is useful to diffuse friendship and to quicken the affections of the absent. No man has need of his own resemblance but for the sake of those whom he loves and by whom he hopes to be remembered."

These remarks were penned at a time when portraits were used as a luxury, the ornaments of palaces, and private dwellings, and public institutions. Now, the opinion is not only true, but more strictly applicable than ever, because photographs of those we admire and love, or perhaps lament, can be carried about with one, and our eyes may be feasted with perpetual admiration.

An album, or collection of family and relative photographic portraits, becomes a kind of speaking record, conveying delight to the eye, recreation to the mind, and impression to the imagination. If carefully preserved, it would supply a link in the chain of evidence in a case of disputed succession to property or estate.

An interesting question here most naturally presents itself for solution, viz., What is the reason that portraits by this newly discovered art are so universally encouraged, and the invention itself so generally commended?

In answering it, there is no need to utter a single word tending to depreciate portrait-painters. They have secured through all time the approval and rapturous acknowledgments of discerning generations as men of genius and illustrious artists, one of whom represented Alexander the Great on horseback so admirably, that a horse which happened to be brought within view, neighed at the horse in the picture. Another took the portrait of a man during his illness, and represented him so truly, that a physician who had never seen the original himself, at once pronounced the man to have a fever. A story much in favour of portrait painters is that of an Athenian courtezan, who, in the midst of a riotous banquet, accidentally casting her eyes on the portrait of a philosopher that hung opposite to her seat, the happy character of temperance and virtue struck her with so lively an image of her own unworthiness, that she instantly quitted the room, and retired for ever from the scene of debauchery.

The most artless answer to the previous question is the truest, as it is also the most obvious, viz., a representation on canvas *may be true*, a photographic portrait *cannot be untrue*. The painter may imitate, he may produce a fine picture, he may reflect honour upon his profession, and do great credit to his accomplishments; but, after all, there is something infinitely preferable in knowing that in photographs you have the reflected image, the actual, real shade of those who now are, or of others who were once, your own.

The perfection of these solar pictures consists in their giving in the most delicate details so true a resemblance of the faces represented, that they will not only bear the closest microscopic examination, but the enlarged latest productions enable a physiognomist to form a judgment as easily from such a portrait as if he had seen the original.

As likeness, then, is the object of the portrait, as fidelity constitutes its worth, and as pleasure is more or less secured without any offence to the eye or taste, portraiture is carried by this art alone to the highest point of perfection.

A reward was once offered by a Roman Governor to whoever would invent a new pleasure. Beyond all question the inventor of photographic portraits would have been entitled to claim it. He has invented a new, innocent, and delightful means of pleasure—a pleasure to be derived from the pleasure of another.

The utility of the art is in exact proportion to the pleasure it affords; useless to those who are not pleased with it, but useful to such as take pleasure in it according as they are pleased.

What printing did for authors and the improvement of mankind in the time of Addison, the invention of photography is now doing for artists and the innocent gratification of mankind. It is producing family pictures, which serve as matters of entertainment, and often of deep interest throughout domestic life; and it is preserving the likenesses of individuals, both male and female, who, in their several paths of eminence, are illustrating the history of our country.—*Photographic Journal.*

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ON A NEW ACTINOMETER.

BY MR. BING.

[Brought before the Photographic Society at last Meeting; but in consequence of the lateness of the hour, this communication was taken as read to the Meeting.]

I BEG to submit to your notice an instrument I have contrived or the purpose of measuring numerically the actinic power of ight. I must, however, crave your kind indulgence, expressing myself in a language with which I am but imperfectly acquainted. The principle from which I started was to measure actinism in the same manner as heat or temperature is measured. Can we speak of measurable degrees of actinic light as we do of heat? and Would there be any use in being enabled to do so? These were the two questions I put to myself. With regard to the first question, namely, measuring the actinic power of light, I was led to consider the difference between heat and light. No column of mercury would rise at the touch of light, as it would at that of heat, to show degrees, divided, from the freezing-point to the boiling point; yet my object was to produce something similar. Setting heat aside now, we know that actinic light, as photography demonstrates, acts more quickly or slowly according to its presence in greater or smaller quantity. According to the medium through which actinic light passes, it will be present in greater or smaller quantity. Now, if we constructed a graduated transparent medium, varying in transparency from the unit to any degree of opacity, we might arrive at something like measurement. Keeping this principle in view, after various experiments, I constructed this little instrument, which I call "The Universal Self-registering Actinometer."

Dividing a surface into a number of little squares, I covered those squares with layers of mica, each number of layers being represented by a corresponding written figure. One layer of mica forms the unit; figure 2 represents two layers; 3 three, &c., up to forty. Upon this instrument I place a piece of sensitized tracing-paper, which I protect at the back by a piece of yellow non-actinic glass. I shall now proceed to print through it. You see, Gentlemen, after a given exposure to the light of magnesium I have produced—say No. 8. Simply looking at the back of the instrument enables the experimenter to examine the number that has been printed, which appears white.

Now, Gentlemen, I come to my second question, namely, Of what use would it be to measure numerically the actinic power of light as we do here? And I must say, because a general want is felt of so doing, keeping at the same time the special purposes in view for which measurement of light might be required, that I was led to devote some humble efforts towards this object.

The uses this little instrument may be applied to are very various.

A photographer would be enabled to judge by it of the general state of actinism, and so be guided as to the time of exposure necessary for his photographic plate at any given time. It is generally known that at different altitudes of the sun, and at different seasons of the year, the state of actinism of light varies very much, even in a cloudless sky. Now, ascertain by experiment once for all how many seconds' exposure under a certain condition of light you would require to produce a negative that is neither under nor over-exposed, and let the actinometer be exposed at the same time for the same number of seconds. Now take note of the number that appeared on the actinometer. By this latter number you will know the length of time required for the exposure of any plate, under any conditions of light whatever. You have only to wait for the appearance of the number you noted on the actinometer, and your plate will have received proper exposure. You might have given thirty seconds' exposure for the appearance of a certain number on the actinometer when you made your first experiment; you might now require three minutes for appearance. In fact, there is no longer any occasion for you to notice the time of exposure at all, but simply to wait for the appearance of your number on the actinometer. In dry-plate photography and the photography of interiors, or wherever lengthened exposures are necessary, this instrument will, for the above reasons, be found of all the more use.

We come next to photographic printing, especially where great exactness is required, or where prints cannot be readily examined, as in Mr. Swan's carbon process. Here, again, let the printer expose both the instrument and his negative to the same light. Let him ascertain, by examination of the first print from his negative, when he considers it to be finished, and then note the number the actinometer shows; he may also classify together a number of negatives that each require the same number. However much the conditions of light may vary, he has now no further occasion to examine any print. He need only look for the appearance of his number on the instrument, which should be exposed to the same light as his negative.

By constructing an instrument like this, but upon a larger scale, a manufacturer of lenses might ascertain with great exactness the comparative strength of different lenses. Let light pass through the instrument only, and let him print from it in the camera, and give with each lens the same number of seconds' or minutes' exposure under the same condition of light; the difference of the numbers printed will show the difference of the strength of the various lenses.

This instrument enables us to ascertain the exact loss a print sustains in the process of toning and fixing. I found the loss to be uniformly about six figures. I toned at the same time five prints; their numbers were respectively 19, 9, 9, 24, 24. Their losses were uniformly six during the process of toning and fixing. The above numbers were recorded for the purpose of testing the difference between direct sunlight and the shadow from a wall. I printed them between a quarter before ten and twenty minutes past ten, one bright morning, about a fortnight ago. I gave first thirty seconds' exposure. In direct sunlight No. 19 appeared. In the shadow, pointing to the wall, No. 9 appeared; pointing to the sky, also No. 9. Then I gave an exposure of one minute in direct sunlight; No 24 appeared. It took six minutes in the shadow to produce No. 24. At what rate the light passes through these successive layers of mica, and what law it follows, I have not been able to ascertain yet. These matters touch upon the domain of scientific investigation; and for this purpose I prefer using an instrument differently constructed. It consists of two plates of glass joined together in the shape of a wedge, inside of which a fluid of any colour may be put. By weighing, it may be ascertained how much colouring matter is added to the clear fluid; and greater exactness will thereby be arrived at. A register of lines and numbers is applied to one of the plates; and the instrument, for accurate calculations of the sun's rays, might be placed upon a clockwork which would make it follow the sun's course, so that his rays might strike it always at the same angle. Science will also endeavour to discover by its means how much actinic light the moon receives from the sun. It will endeavour to measure the actinism of the various colours of the rainbow, of reflecting bodies such as water, and various other matters too numerous to mention in this paper. I must, however, speak more particularly about vegetation. Every one knows how a plant in a dark place struggles in its growth towards any aperture where light enters. Science also will endeavour to discover the influence of various degrees of actinism upon vegetation.

Correspondence.

A HINT FOR LANDSCAPE PHOTOGRAPHERS.

Sir,—I have been surprised and disappointed that the results of the admirable triple lenses now so much in use have not appeared more generally in the shape of photographs from various picturesque parts of the world, and exposed for sale in this country. But of all places, I know none where the limited field of view hitherto attainable in our cameras has had so deleterious an effect on the production of pictures giving an adequate idea of the city, as Venice. I am intimately acquainted with all parts of Venice, and do not hesitate in saying that a rich collection awaits any photographer who will arm himself with a large triple lens, and devote a short time to the "Queen of the Adriatic." I do not speak only of the many grand general subjects which may thus be amplified, but of numberless beautiful bits among the narrow canals, which have been impracticable to the photographer, owing to the convergency of the lines of architecture, and to the impossibility of getting enough of the subject into the field of view, "cribbed, cabined, and confined," as it has been.

With hopes that you will insert these remarks in your excellent paper, and that photographers will avail themselves of them,—I remain, yours faithfully,

Alnwick, November, 1866. Calvert R. Jones.

PHOTOGRAPHERS' RELIEF FUND.

Sir,—It is an unpromising sign when "everybody's business" is made nobody's duty; as in all probability the scheme started will add another item to the huge heap of projects which would have blossomed and borne vigorous fruit but for the characteristic negligence of that dilatory myth whose distorted optics invariably conjure up mountains where molehills only exist.

A photographers' relief fund is a crying necessity. As usual, nobody accepts the preliminary work, and "everybody" anxiously awaits the first move. "Everybody" might wait, and wait; meanwhile, the rude wintry blasts are sweeping o'er many a cheerless roof, and biting cold is making misery more bitterly intolerable. Everybody might wait, and when, perchance, again some helpless one, as a last forlorn hope, is tempted to grasp the icy hand of death, the fruitless enquiry may again be revived, "Will nobody move to stay the growing evil?"

"Strike while the iron is hot," is an excellent maxim; but "Procure your iron before you prepare to strike," must also be regarded as words of wisdom. "Procrastination is the thief of time," and the destroyer of good resolutions. Let us, then, vigorously commence the work set before us at once, by appealing to those many generous ones who are, doubtless, ready to supply the metal when skilled workmen offer themselves to hammer it into shape. Want of room seems to me a sorry excuse. There is an excellent meeting chamber beneath the roof of King's College; another in the vicinity of North London; and yet another situated in the South of this great metropolis. In each of these, from time to time, the luminaries of photography are wont to assemble to discuss matters pertaining to the art; and surely an evening set apart, at one of the places referred to, for discussing the subject of a relief fund, would be as profitably spent as if the time had been employed in arguing on the merits of lenses or the last new thing in developers. Possibly, much valuable time would be saved if, before the workmen were called together, the amount of workable material could be ascertained. I would, therefore, suggest that all who take an interest in the matter should forward to you, Mr. Editor, or to myself, if need be, a statement of what they are willing to contribute, either as a periodical subscription or a donation. The list so obtained might then be placed before a meeting specially called for the purpose. A committee could then be chosen, and the scheme set fairly afloat; and as no photographer desires the fund to assume the form of a direct charity shop, I see no reason why the institution should not, in some measure, become self-supporting. Hoping the remarks I have offered will arouse "everybody" from its apathetic position, and induce all to consider that what is "everybody's" business is, to all intents and purposes, *emphatically everybody's duty*,—I remain, yours truly, W. T. BOVEY.

Willesden, November 19th.

LAC VARNISH.

SIR,—Allow me to make a few remarks on Mr. Young's letter in the NEWS of the 9th instant, relative to my communication of the previous week, on a negative varnish.

I have used the shellac varnish I described about three years, and never found any "finish" that would not dissolve sufficient for our purpose. All we want of a varnish is to prevent mechanical injury to the negative while printing; if it will do nothing else, the better, for they are evils in every other respect. We should require no intensification if it were not for the varnish. I have found it very hard; and not to peel off in damp weather, which certain other varnishes did, much to my loss; and also not to reduce the negative so much as the more sticky ones did. These latter are very apt to peel off in the damp weather we have in this part of the country.

The Sœhnée varnish is a shellac one, and the best I have ever used. I shall certainly try sandrac and shellac together the next time I make varnish, as recommended by you, sir.—I remain yours truly, S. T. REEVES.

Plymouth, November 19th, 1866

PS. The spirit I am now using has a sp. gr. ·815, and contains neither resin or shellac, only methyl (wood spirit); even if it did, it would be no injury for varnish making.

VARNISH FOR PRESERVING PRINTS.

SIR,—On reading in your last number an article on preserving prints, you mention a varnish as introduced by Mr. Nash. I beg to testify as to its qualities, as when I first had it is nearly two years ago. I applied it partially to some prints, and find, on now examining them, they are fully preserved on the part applied, while the other part is faded and turned yellow; and I have since used it as varnish for my negatives, and have found it harder and more durable than any varnish I have ever used before, and warrant it not to peel or crack; and I am only surprised that Mr. Nash has not brought it out before now; and not being able to get any at the warehouse I deal at, I was obliged, only a fortnight ago, to send to Mr. Nash for a fresh supply.—I remain, yours truly, F. WHATLEY.

3, *Strewan's Place, King's Road, Chelsea, Nov.* 18*th*, 1866.

SHELLAC VARNISH FOR PHOTOGRAPHERS.

SIR.—It vexes one to see a useful suggestion, like that of Mr. Reeves', for making varnish, tumbled into the limbo of useless things by your interested and very positive correspondent, Mr. W. F. Young, whose experiments have proved conclusively (to himself and one other gentleman) that "no varnish containing any large proportion of shellac can, by any means, be made to meet the requirements of photographers." It has vexed me so much that, for the first time, though an old photographer, I shake off my indolent repugnance, and ask you to put me in your NEWS. For nearly five years I have made my own varnish. I have varnished ten thousand card plates with it, and all my larger sizes, including some hundreds of 10 by 8 and 12 by 10, and not a few larger, up to 24 by 18. I find it better than any I have ever bought, and I have used the varnish of at least eight or ten different makers, including the famous ones. My operators have always praised it, and several photographers to whom I have given it say that it is as good as can be. Here is the formula:—

Two pounds orange shellac, clean and good.
One pound sandrac.
Two gallons methylated finish.

Break up the shellac with a rolling-pin, or anything handy. The sandrac will dissolve readily enough. Put the whole into a two-gallon tin bottle, and let it stand in a warm place for two or three days, shaking vigorously now and then when you find a minute to spare, and a little exercise not objectionable. Then let it rest two or three days. By that time a good portion will draw off clear and fit for immediate use. Add another half gallon of finish to the bottle, and repeat the treatment. Less clear varnish will now draw off. The rest must be filtered. Here is the bother; but a little patience and common sense will easily surmount it. After trying several plans, I found this the best. Make a number of filters out of common blotting-paper (not ordinary filters, but one thickness of paper only), funnel shape, and cut out of such a shape and size that when turned up they are about four inches deep and three inches diameter. Overlap the joint a quarter of an inch, and gum it well with thick gum, and turn up the apex a bit for security. Procure three or four glass vessels rather less in diameter than the filters, and twice their depth. Fit a filter into each, turning the paper over the edge, and gumming it on. Now fill with varnish. In an hour or so, perhaps, a fourth will have run through. Refill the filter, but do not repeat the filling more than once. Place a piece of glass over each, and when no more varnish will run, cautiously remove the filter, pour off the varnish, and begin again. Common sense will suggest that the receivers should be placed where they are well out of harm's way, and yet frequently seen. These simple conditions observed, varnish-making is easy enough.

A word as to quantity. Make enough to last two or three years. The filtration is not an operation one would like every few months, and the older the varnish gets, the better it is. As to the variability of the gums, I find no difficulty. With the proportions given, I always find my varnish a little thicker than I want it.

If these observations, "based upon the results of a [tolerably] large experience," as your correspondent says, should lead some, who have been frightened by his authoritative declaration, to try for themselves, I am satisfied that they will prove the value of Mr. Reeves' instruction. Any way, it is not fair that dogmatizing experimentalism should have it all its own way. Economy has now become, with most photographers, a *sine qua non*. For less than threepence, as good a bottle of varnish as the Sœhnée at 1s. 9d., can be made.—I am, dear sir, yours respectfully, A NORSEMAN.

Newcastle-on-Tyne, Nov. 14*th*, 1866.

SILVER IN THE WHITES OF ALBUMEN PRINTS.

SIR,—In your Journal for September 28th, I read with regret an angry note from Mr. John Spiller, commenting upon a paper of mine on the above subject which had been printed in your columns.

His ground of complaint is, that in giving the results of my experiments in this direction, I did not cite him as having first observed what I spoke of as a well-known fact; viz., that in the ordinary albumen print, silver could be detected in the whites.

To this I answer, that I was simply giving no results of my own work. Had I been writing an historical sketch of our knowledge on this subject, the case would have been different; and then it would have been proper for me to have stated to whom we were indebted for our first observation of the fact.

But in that case, I should have been called upon to cite, *not Mr. Spiller*, but the distinguished French photographers, MM. Davanne and Girard, who *published the same fact three years before* Mr. Spiller claims to have done it. His paper he cites as having been published in 1862. On the 28th of November, 1859, MM. Davanne and Girard had distinctly announced the same fact.

If, therefore, there has been any appropriation of the labours of others, you will easily see where it has taken place; and if Mr. Spiller will compare the gentlemanly and almost friendly way in which these photographers reclaimed priority* against a real invasion, with the intemperate tone that he has used against an imaginary one, I think he will regret his publication.—Respectfully yours, M. Carey Lea.

Philadelphia, November 1st, 1866.

RECOVERING SILVER FROM ASHES.

Sir,—Your talented correspondent, Mr. Spiller, in his letter to the News of the 9th inst., disputes the accuracy of the statement made by an American correspondent, relating to the recovery of silver from the ashes by nitric acid. Now, without entering minutely into the matter, allow me to make a suggestion which, I think, may account for the great discrepancies found to exist in the experiments of those two gentlemen. If, in burning the paper to recover the silver, the operation has been performed in an open space, the amount of silver reduced to the actual metallic state will not be found so great as would be the case were the paper placed in a stove and burnt down with a strong heat. In fact, in the latter method, I have obtained larger masses of metal, which has run together in small globules during the burning; whereas, in the former plan, I have always found the ashes to contain a large amount of chloride; so much so, indeed, that on their being exposed to light they have changed colour considerably, showing conclusively, that although the paper had been charred, a large proportion of the chloride remained unchanged. I need hardly mention that a larger amount of organic matter would be got rid of by a strong heat, by which I mean such as would be obtained by using a stove having a good draught.

I tried the nitric acid process some years ago, but finding the whole of the silver could not be recovered without fusing the remains in a furnace, I gave it up.

The method now adopted by me is simply this:—Mixing the ashes with the sulphuret of silver from the hypo baths, and adding nitre. This compound burns in the furnace with an intense heat, and must be put into the pot by small portions only at a time. The sulphuret, which is at all times troublesome, is reduced readily to the metallic state by this method, which I have found excellent, and is the only one now employed by me.—Yours truly, W. England.

A SUGGESTION TO PORTRAITISTS.

Sir,—That a great change is coming, must be evident to all who look upon photography as a profession.

That fascinating little toy, the carte-de-visite, no longer rules supreme.

Cautious men, who think of the main chance, will now hesitate before adopting, as a business, one which for some years past has been a sort of California to its followers. In all probability this may be beneficial to general photography, as many who could take a tolerably good carte-de-visite will scarcely feel themselves equal to the task of producing a larger and consequently more difficult work, one requiring skilful manipulation, and absorbing more time and care. The price of the new cabinet portrait, in order to secure its popularity, should not be too extravagant, and it must be palpable, that from its size and cost, it will not be given away so freely as its small and inexpensive predecessor. These considerations will doubtless cause many who have hitherto practised photography as a remunerative occupation to seek some other employment; and it will behove many who are stout-hearted and true disciples, to begin afresh, not only, as they will have to do, in the mechanical department, but in the mental also. As the easiest and most agreeable way of cultivating taste and judgment, I would suggest that the student of photography should follow the example of the student of painting, studying the life-like pictures in our public galleries, and, by comparing them with nature (looking at them earnestly, suffering the mind's eye to penetrate the sombre veil which time and age have thrown over them), learn to see how real and true they are; or, leaving the old painters to their well-earned glory, turn to the living forms which Wilkie and Mulready have left us, and in such works as these see that graceful ease, light shade, and expression which rivet the attention of all, even the least educated.

This mode of training the eye to see the light, shade, and reflections necessary to produce roundness and vigour, also discarding all accessories which do not assist the composition, must eventually conduce to less ill-usage of the lens than we now too often see in ordinary photography. If my humble suggestion be taken in good feeling by any who feel deficiency, I shall be glad that I have had the courage to propose this course of study.—I am, sir, your obedient servant, Charles Taylor.

November 13th, 1866.

LEPTOGRAPHIC PAPER.—SOLUBLE GLASS.

Sir,—If the examination of this paper recorded in a contemporary may be trusted, your recent suggestion that the new paper, called leptographic, is coated with collodio-chloride of silver, can scarcely be correct, for a film of collodion could not be submitted for an hour to the action of ether and alcohol without being dissolved.

If this be so, can you afford any information as to the probable mode in which soluble glass, suggested in your contemporary as the substance used for coating the paper, can be employed in securing a sensitive surface? How can this substance be used and made sensitive? Could chloride of silver be formed by double decomposition suspended in it as in collodion? Could it be lifted in an unbroken sheet as described? Is it a permanent substance itself, and is it moderately cheap? And has the paper yet been introduced into this country?—Yours, A Printer.

[See a leading article in the present. There is no doubt about the coating consisting of collodion. In the examination in question, there is, doubtless, an error of observation, which you will see explained in a foot-note to our leader. Soluble glass is decomposed immediately by contact with nitrate of silver, or any soluble salt of silver, and could not be employed as a vehicle for such salts, nor is it probable that chloride of silver could be formed in it. It does not form a tough coherent film which could be lifted without breaking. It is so far from permanent, that a film of it is decomposed by the carbonic acid in the atmosphere, gradually becoming converted into carbonate of soda (or potash, if silicate of potash were employed) Attempts have before been made to employ it in photography without success. We experimented with it ten or twelve years ago. It is cheap enough, if it could be employed. We have not yet heard of the paper having been introduced into this country; but we should think that it doubtless will be. —Ed.]

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* 'Répertoire de Chimie Appliquée,' Vol. IV., p. 434.

Talk in the Studio.

Value of a Photographic Studio in the County Court.—At the last sitting of the County Court, Redruth, Cornwall, a builder of the place brought a claim against a photographic artist for an alleged balance on an account of £28 10s. It appeared, by the statement of the photographer's solicitor, that the builder had agreed to erect the studio for £25 10s., and that his client held the plaintiff's receipt for that amount. The plaintiff, however, claimed for £28 10s. 9d., the excess being for extras not agreed for. It then appeared the building had been valued by competent tradesmen of the town, who unanimously declared the sum already paid to be the full value, extras included. On this his Honour gave judgment in favour of the photographer, who further proved a loss of some £3 on the transaction, in the shape of old materials worked into the new building.

Rapid Solar Camera Work.—In our issue for October 5th (p. 475) we described an ingenious modification of Mr. Stuart's solar camera by our esteemed American Correspondent, Mr. J. Carbutt. Our friend, Mr. E. L. Wilson, the able Editor of the *Philadelphia Photographer*, in describing a recent ramble, incidentally mentions the exceedingly rapid results obtained by Mr. Carbutt, by this camera, as follows :—Arrived at Chicago," we there joined our friend, Mr. John Carbutt, and spent nearly a day examining the curiosities and beauties of his gallery. The most wonderful attraction was his solar camera, described so accurately in our last. While there, Mr. Carbutt sat a gentleman for a solar negative, and in exactly fifteen minutes from the time he began to make the sitting he had a proof ready, printed by his camera, to show his customer. We think this is as quick work as there is on record, and speaks much in favour of Mr. Carbutt's solar camera. Every photographer is welcome to go and see it, and take copy. Some of the heads made by it are certainly equal, if not superior, in sharpness to anything that could possibly be made by the contact process."

Photographic Relief Fund.—We have been favoured with a letter from Messrs. Southwell, Brothers, who, referring to a letter by Mr. Taglis, offering to print a thousand prints to be sold on behalf of a Photographic Relief Fund, undertake to supply a suitable negative for the purpose. At present there is no organization in existence for the establishment of the Fund. We shall preserve a record of these offers for acceptance when the Fund is organized.

Gilt Mounts for Card Pictures.—We have been favoured by Mr. W. R. Holyoake, of the Alexandra Studio, Great Coram Street, with some examples of card portraiture on a new style of mount which is very effective. It consists of the ordinary card mount, upon which a rectangle in matt gold is printed, covering the whole surface except a narrow white margin. The print is cut oval, and mounted in the centre, a line of deeper gold running round the oval. The effect of gold in giving value to pictures is well known to all who have given attention to the subject. The prints comprise some excellent portraits of literary men and actors, in which character is admirably rendered.

The Royal Academy.—The secretaryship of the Royal Academy is about to become vacant by the resignation of Mr. J. P. Knight, R.A.

The Royal Microscopical Society.—Lord Belmore has been directed by Mr. Secretary Walpole to acquaint the President of the Microscopical Society, James Glaisher, Esq., F.R.S., that her Majesty the Queen has given her gracious command to the Society to assume the title of Royal.

Present from the Emperor of Russia to Mr. Glaisher.—A magnificent diamond ring has just been presented to James Glaisher, Esq., F.R.S., by the Emperor of Russia. The present was made through Admiral Crabbe, the Russian Minister of Marine, who communicates his Impeial Majesty's appreciation of the services rendered by our eminent English meteorologist. The ring is exceedingly massive and valuable, the central mosaic, portraying the Imperial Eagle, being surrounded by a ring of ten large diamonds; and in the interspaces and side ornamentations are no less than sixty-two of smaller dimensions.

To Correspondents.

Enamel.—Any method of photographic enamelling in which bichromate in combination with albumen and honey, or similar organic substances, is employed, is an infringement of Mr. Joubert's patent.

W. P. P.—We regret to say that we are not in possession of any information on the subject which could aid you at all in getting such an appointment. See leading article in this week's issue.

G. (Oxford).—We prefer camera-printing for transparencies, as being simpler and more under control than dry-plate printing by contact. The exact mode of procedure much depends upon the purpose for which the transparencies are required. An article by Mr. Blanchard, in our Year-Book for 1864, gives some valuable information on the subject.

F. T. Stowell.—We have not yet heard of any agent for the leptographic paper in London.

J. Hammond.—Mix a little albumen with the colour with which you retouch your albumenized prints ; this will make the touched portions harmonize with the rest of the surface. 2. For the floor of the studio, a carpet of quiet, unobtrusive pattern, is better than oilcloth.

Novice.—Photographs intended for colouring in crayons should be printed on rough drawing-paper, the surface of which presents a tooth to the crayon. Ordinary plain paper, or albumenized paper, is not suitable ; but it is possible, by skill and care, to give these a surface which will bite the crayon. This is done by applying to the surface a paste of gum tragacanth, or a solution of isinglass, in which some powdered cuttle fish bone, or very fine pumice-stone powder, is mixed. To secure an even coating requires great skill and care, and the coating, being semi-opaque, slightly obscures the image, rendering more care in colouring necessary. To prepare photographs for colouring with water-colours, the application of Newman's sizing preparation gives excellent results.

N.—Thanks. The diagrams are in the hands of the engraver. The former one was not thrown away as useless, but put aside for use at a future time, when the pressure of current matter was less than at the moment we received it. In the rapid succession of editorial duties, matters so placed aside sometimes get overlooked without intentional neglect.

C. D. (a learner).—If your camera be a square one, turn the inner frame so as to allow the plate to rest horizontally instead of vertically. If it is not a square camera, turn it upon its side, so as to place the plate in the right position. Of course, in order to get the figures small enough, you must place the camera considerably further from the sitters than for ordinary cards.

Martin.—If you had stated in detail the formulæ you employed, we might better have been able to help you. In the absence of these details we can merely suggest that the deep red colour in newly-made collodion is due to the liberation of iodine, which may be caused either by some trace of acidity in the soluble cotton, or the presence of acetic ether in the solvents. It does not necessarily follow that the collodion will work badly. Free iodine in a collodion containing bromide rarely injures its sensitiveness. Sometimes the deep colour disappears, and the collodion becomes clear again from the formation of iodide of methyl, which is colourless. 2. We have not any practical knowledge of the lenses you name ; but it is tolerably certain that neither of them will be as good as those of the best English makers. 3. The green tint in the silver solution you describe is doubtless due to the presence of nitrate of copper. It will not be injurious in the printing bath.

K. K. K.—We have succeeded in cementing glasses by means of the heat afforded by a hot water bath. It is not improbable that opticians frequently use greater heat ; but their aim is to use the least degree of heat which will effect the purpose, to avoid risk to the lenses. When the water bath is used, and the surface of the glasses to be cemented is large, time and patience are necessary, in order to get the balsam sufficiently melted to run freely to the edges. A gentle pressure may be used to bring the surfaces of the glasses into contact ; but no such force as would break the glass. It is very important that the two surfaces should be perfectly true, otherwise it is difficult to maintain perfect contact even after it has been apparently secured whilst the resin was in a fluid condition. We have no reason to believe that some samples of the balsam require a higher temperature than others.

W. W.—The sample of collodio-chloride you forward is not a good sample : it lacks sensitiveness, and the pictures lack vigour ; but we cannot understand under what circumstances you found it require a whole day's exposure to give a faint image. We tried it, both on glass and paper, and found half an hour's exposure—partly diffused light and partly faint sunshine—was sufficient to print a picture. We then added about half a grain of citric acid and one or two grains of pyroxyline to an ounce of the sample sent. This at once increased both sensitiveness and vigour, and materially improved the quality of the pictures produced. If collodion makers would take our advice, they would date all sensitized collodion. Why do you not prepare your own, according to the simple formula we have published?

X. Y. Z.—The crucibles known as "London pots" are best for reducing chloride of silver. The plumbago pots are less liable to crack than those made of clay ; but the melted metal and flux often make a hole through the plumbago. It is a good thing to use an old plumbago pot to hold the London pot, as a safeguard should the latter crack, a thing which, however, rarely happens if the heat be applied judiciously. The London pots (of fire clay) are less expensive than those of plumbago. After mixing the dried chloride and the flux, throw in a little at a time into the crucible, which has first been suffered to become red-hot. If too much be placed in at once, ebullition is apt to follow, which causes waste. It gradually melts down, and when sufficient has been put in the pot, cover it up and maintain a strong heat, as nearly white as possible, for a quarter of an hour. If the chloride be pure, it will yield about 75 per cent. of metal. There is not much danger of loss if the crucible remain sound, unless the operation be protracted at a low heat, in which case there may be a loss by the volatilization of chloride of silver. It is desirable as quickly as possible, therefore, to get it melted. 2. All the best portraitists whom we know invariably insist on the use of the head-rest.

L. M.—The best mode of colouring photographs is very much a matter of taste, and depends, moreover, much on the size and purpose of the picture. Permanency is probably best secured by oil colouring, as the image is then protected from the action of outward causes of fading.

Erratum.—In the Report of the North London Meeting in our last, Mr. F. J. Stowell is reported as having been elected a member. It should have been Mr. F. T. Stowell.

Several Correspondents in our next.

All Communications for the Editor to be addressed to 15 and 16, Gough Square, Fleet Street, London, E.C.

THE PHOTOGRAPHIC NEWS.

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THE INTERNATIONAL EXHIBITION OF 1867.

We call the attention of our readers to the remarks of M. Lacan, our Paris Correspondent, upon this subject and the complaint uttered in our last; and to M. Lacan's promise to obtain, as early as possible, the best information.

In regard to agencies, we may remark that we have received numerous offers to undertake the general interests of photographers, and various intimations of a desire to undertake charge of individual interests as private commissions. We were well aware, of course, of the existence of such agencies. Probably every intending exhibitor has received many circulars announcing their existence. The difficulty in regard to all these private agencies is twofold: first, that however respectable and trustworthy they may be, few photographers have opportunity of satisfying themselves upon the subject; and next, that, as a rule, they will necessarily entail a much greater expense than a general agency undertaking the whole work We urge again, then, as we urged before, upon the authorities, the importance of appointing an officer themselves, or sanctioning the appointment by a combination of exhibitors, of a suitable person to receive, unpack, store cases, and repack the pictures to be sent by English photographers, who will contribute chiefly to aid in a fair representation of photography in this country, and not for personal gain.

We received, at the moment of going to press, and appended to the article in our last, an intimation from an official source that the Commissioners in this country would request the Photographic Society to appoint a representative to superintend the hanging of English photographs. So far, so good. But, on behalf of English photographers, we ask for an arrangement whereby they will be relieved from anxiety as to the transit, unpacking, and return of their pictures.

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PHOTOGRAPHY IN THE MAMMOTH CAVE AT KENTUCKY.

We have been favoured by Mr. Charles Waldack, of Cincinnati, with a series of stereographs of very rare interest. Photography, regarded until recently as essentially an art depending on daylight, and its products as sun-pictures, has, within the last year or two, pushed its triumphs into regions where daylight never penetrated, and upon which the sun never shone. Professor Piazzi Smyth has recently ransacked the secrets of the Great Pyramid, bringing away with him photographic records by which he verifies his theory concerning what he has phrased "Our Inheritance in the Great Pyramid." Mr. Waldack has, in like manner, with stored sunlight in the shape of magnesium, brought to daylight the secrets of one of the greatest natural wonders of the world.

The Mammoth Cave of Kentucky is literally one of the greatest marvels in a country where nature seems to have done everything on a gigantic scale,—an immense cave, the extent of which is unknown, as its extremest recesses remain unexplored. How far the knowledge of its topography may have been increased of late years we are uncertain; but a few years ago it had been explored for a distance of eighteen miles from the entrance, and that extent was regarded as but the vestibule to this gigantic temple of mystery. Not less than 226 avenues, 47 domes, 23 pits, and many rivers in which there were 8 cataracts, had been recorded. Grand stalactites, forming Gothic arches; natural bridges, natural huts, and mimic palaces, with roofs in which the lime formations hang like grapes and sparkle like diamonds, are some of the features which add to the beauty as well as increase the wonder of this city of darkness. The temptation to photograph such a place was as great as the difficulty of succeeding. Mr. Waldack has made the attempt on a grand scale, and has succeeded far beyond legitimate expectation.

On another page we give Mr. Waldack's account * of the operations, of which the photographs he sends us are the result. Apart from the value and interests of these pictures in affording aid to thousands to visit the cave in fancy, and catch glimpses of the dismal gloom of the "Bottomless Pit" in one part of it, of the beauties of "Martha's Vineyard" in another, and of the stately stalactites which support the "Gothic Chapel" and "Gothic Avenue" in another, these pictures have an especial interest, in a photographic point of view, as illustrating the possibilities of the art. As a whole, these are incomparably the best photographs of this kind, taken by this agency, that we have seen. More difficult to secure, because of the extent and varied nature of the objects, many of these strike us as more perfect than the photographs which we have seen of those secured of the interior of the Pyramid. Of course, the difficulties are manifest in the picture: in using any artificial light proceeding from a point or small source, there must be the difficulty of even diffusion and the rapid decrease in illumination upon all objects far removed from the source of light. Yet in many of these pictures we obtain a good idea of the vastness, the position, and character of the scenery. Where a single object is to be illuminated with such a light, the difficulty is trifling; but here the whole value of the results depends upon the rendering, and consequently the illumining of a vast extent of space and objects; and this has been effected with much more success than might have been anticipated. Where groups, &c., have been attempted, or specific objects, the result is often excellent. The "Orchestra" in the "Gothic

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* We are indebted to the courtesy of our friend Mr. Wilson, the esteemed Editor of the 'Philadelphia Photographer,' for an early proof of Mr. Waldack's article, which will appear in the 'Photographer' for December.

Chapel" is admirable. A group of five persons, appropriately engaged, seated in what is called the "Grand Relief," in enjoying luncheon, is good. An instantaneous group, obtained by burning three-quarters of an ounce of magnesium (chiefly in powder), is very good. One of the chief difficulties experienced arises from the white cloud quickly formed by the magnesium smoke, which is rendered in one picture with the especial view of illustrating the effect produced, and showing that the dense white cloud reflects the greatest amount of light, and becomes the most prominent object in a picture in all other respects excellent. Mr. Solomon has recently introduced an improved lamp with a chimney like an argand burner, the current of air rushing up which carries off the smoke. But in photographing in a cave we fear that something else would be required, as the smoke carried up the chimney, although carried out of the way, must finally escape into the cave; and thus the difficulty, although diminished, would not be entirely removed. We believe that Mr. Hart has a plan by which the smoke is condensed, and does not escape at all; but the cost and uncertainty of patent laws keeps the project in abeyance until some remunerative outlet is found for it. Such a plan is pre-eminently needed in an undertaking like this, which Mr. Waldack has with so much enterprize undertaken, and which, although he has met with considerable success already, we believe he contemplates attempting again.

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PICTORIAL TOOLS v. SHARP LENSES.

"And so it has come to this, it seems, according to Mr. Mayall and others, that we are to seek up our old, discarded, bad lenses once more: a Voightlander in Mr. Mayall's case, and any number of old French lenses in the case of any other man. It used to be no difficult thing to obtain a lens without a focus; the difficulty at one time was to obtain a lens that had a focus. Now it seems we are to go in for fuzziness, and abjure sharpness." This, and much more to this effect, was the tenor of the remarks of an old and esteemed photographic friend, in reviewing the discussion at the last meeting of the Photographic Society.

It is probable that our friend's remarks were but the counterpart of the thoughts of many others. It is so natural to a photographer to admire good definition, and to prize a sharp lens; such admiration is so bound up with the traditions of photographers, that it is not surprising that many are startled by the new doctrine which has suddenly burst into recognition. In the discussion at the Society, the question whether diffused focus or sharpness was desirable was scarcely asked. It was taken for granted that soft, diffused definition was the desirable and right thing, and the discussion was simply on the best mode of securing it. No one rose to do battle for sharpness; disputants on both sides gave up that. Time was in that Society when the position would have been disputed inch by inch; and no sacrifice of an iota of absolute definition would have been conceded in favour of pictorial conditions by those who assumed the position of optical authorities. Any lens with the slightest perceptible amount of depth of focus, or departure from microscopic definition on one plane, would have been uncompromisingly condemned as a bad lens. It is not surprising, then, that many photographers are puzzled, and ask, Is the new doctrine true? And if it be true, how is it that so many able opticians and other authorities have so many years held the opposite view?

Let us first ask, then: Is the new doctrine true; that is, Is the end proposed desirable? The object of the photographer, it will be conceded, is to make a picture; and the lens is one of his tools. His object is to produce on one plane—that is, on a flat surface—a representation of a solid body; and for simplicity, we will at present deal with a human head. In order to do that head justice, and secure a satisfactory pictorial presentment of it, every part should be sufficiently defined to indicate its form and texture, and also to produce—lighting and other things being properly managed—the effect of modelling, relief, and roundness in the whole. A perfectly corrected lens, however, is incapable of yielding such an image as we have described. It possesses a sharp focus on one plane, and, if it possess a sufficiently large angle of aperture to work quickly—an imperative condition in portraiture—it so rapidly falls off in definition behind and in front of the focal plane, that in producing a large portrait of a head it is impossible to do justice to all parts. If the focus be on the cheek, the texture of the skin is defined with such microscopic accuracy that every freckle, wrinkle, and inequality of colour or surface, scarcely noticeable in life, is rendered with uncompromising fidelity and startling accuracy. But the nose is imperfectly defined; however precise its outline in nature, it looks fuzzy and uncertain in form in the picture; the hair at the back of the head—perhaps magnificent curls—are not defined, and, for all the picture indicates to the contrary, may be masses of wool or hemp. This is the result of a perfectly corrected optical instrument. Now try the pictorial tool, which is the lens with its corrections modified with a specific view to producing a certain result. It has no absolute focus; its sharpest definition bears about the same relation to the definition of the corrected lens that the line of a crayon does to the line of a steel pen. It is focussed on the cheek, and defines sufficiently to indicate texture, without the effect of exaggerating it; freckles and wrinkles are not ignored, but slightly softened the one into the other; it defines the eye, the most important feature for crisp definition, as sharply as the painter would define it; the form and outline of the nose is well made out, and the curls at the back of the head show their precise form and texture. The whole contour is sufficiently defined, without any hard or cutting lines; there is a softness in the whole, because the gradations are blended, as by the painter's badger-hair softener, instead of every inequality in the skin, with the light and shade of inequalities, being sharply and crisply made out. There is a slight superiority of definition in one plane, and that is in the focus of interest in the face, the eye.

Now, which of these pictures is best, we ask? Photographic portraiture has been styled justice without mercy. We contend that a portrait of the first kind we have described is neither justice nor mercy. "Oh, yes," some will reply; "as you have stated the case, the second picture is much the best; but we should prefer a head sharp all over." Without discussing points of taste, we have simply to respond: "You cannot have it." The absolutely sharp definition on one plane of a solid body with many planes is an impossibility. The most perfectly corrected lenses define one plane only on one plane. By decreasing the angular aperture, and attenuating the pencils, the depth of approximate definition is increased; but this is effected at the sacrifice of light, and involves the prolongation of exposure, which cannot be tolerated in portraiture. It absolutely comes, then, to this: photographers must choose between the two—the use (for portraiture) of a lens perfectly corrected for a purpose inapplicable to their wants; or a pictorial tool constructed expressly in regard to the purpose for which it has to be used. Many of the ablest portraitists have for years been making this choice almost unconsciously, using the lenses they found giving them the best results, without any enquiry as to the source of excellence in their instruments.

It being admitted, then, as for the most part it will be, that the pictorial tool is preferable for portraiture to the sharp one-plane lens, it will be asked, How is it that able opticians and other good authorities have been so slow to recognize this want in photography? There are several reasons why this has happened. Opticians, in the first instance, in making photographic lenses, have aimed to secure in them as a matter of course the same perfect correction they applied to other high class optical instruments—telescopes, for instance. In other optical instruments the most perfect definition of one plane of an object is necessary; and as successive planes may need to be examined, they can be brought successively into focus; but the photographic lens is the only optical instrument whereby pictures have to be produced—pictures which require to have on one plane as much as possible of the definition which, in the corrected optical instrument, can only be secured by bringing various planes successively into focus. Opticians, however, acted very naturally in producing the most perfectly corrected instruments, and priding themselves on securing this correction. In addition to this, in the early days of photography, the discussions on these points, and the influence in this direction, were chiefly confined to those gentlemen interested in the scientific aspects of photography, and who had little knowledge of, and less feeling for, art. The cry was raised, many years ago, by a distinguished artist and photographer, Sir Wm. Newton, "Give us softness, give us diffused definition;" but not being a scientific man, or familiar with the resources of optical science, he proposed an inefficient means, and his proposal was denounced indignantly by some, and received with good-natured derision by others. The same cry has been raised at intervals ever since. A few years ago, Mr. Durham, the eminent sculptor, sitting in the chair at the Photographic Society, referring to this point, exclaimed, "Those pictures which you" (referring to the optical men) "call bad, we, as artists, call good, and wish we could get more of them." In our own pages the question of diffused focus has been discussed, and the importance of regarding the portrait lens as a pictorial tool has been urged for years. Some photographers, generally the best portraitists, both in this country and on the Continent — without explanation or parade, possibly in some cases scarcely knowing why, or understanding how, but perfectly comprehending the excellence of the result—have produced pictures with softness, diffusion of focus, and modelling. The public have admired, as have also many photographers, and wondered in what the secret of producing such pictures has consisted.

It is not surprising, however, that good opticians, strong in the traditions of their art, and with the especial influences of those who assumed the scientific dictum in photography supporting them, should have adhered to the production of perfectly corrected lenses. Mr. Dallmeyer avowed at the recent meeting that he had gradually yielded to the private pressure of some of our most artistic photographers, in producing an instrument rather intended as a pictorial tool than as a strictly corrected optical instrument. Other able opticians will doubtless work in the same direction when they are satisfied that photographers require such instruments. Mr. Ross, the representative of a house celebrated for the perfect correction of its instruments, will doubtless, if even under protest, produce such lenses as his customers may demand, as well as such as he believes to be most perfect in themselves. The great point is, for photographers to understand what they require, and determine what they will use.

"But what of the old, imperfect lenses of inferior makers, which we have for years past discarded, because they had no focus; will they now serve our purpose, like Mr. Mayall's Voightlander?" some will ask. The answer is a very simple one. These were intended to be perfectly corrected, and failed in that particular from the carelessness or incapacity of the manufacturers. The error of some few of them might happen to be of the right kind, and give good results. But there is a great difference between an accidental defect changing to serve a useful purpose, and a given quality which, being intended to serve a purpose, cannot be called a defect, being secured in an instrument by design, and exactly proportioned to the result, and determined by careful calculation by a skilful optician. The great difficulty attending the idea of using up the old, imperfectly-corrected lenses is, the uncertainty which must attend it. A dozen bad lenses might be tried before one was found in which the accidental imperfection was exactly suited to produce good results. The old story related by Pliny, of a painter, in a burst of impatience, throwing a brush charged with colour at his canvas, exactly producing the best rendering of the foam on a horse's mouth, is an illustration. The most perfect effect was here produced by chance; but the brush might have been thrown a thousand times again without gaining the end. A good instrument, with qualities fitted for doing its work, must be produced by design by a skilled optician. We do not enter into the consideration of the means at the optician's disposal here; we simply insist that it is an optician's question, and that it "comes from art, not chance." The supplementary means which Mr. Claudet proposes is another distinct question, which we are not now to discuss.

Nor is the optician's art, which has progressed so much of late, rendered of any less importance in relation to perfectly corrected lenses. For many branches of photography, the most perfect sharpness will still remain of vital importance. The advice of Mr. Hughes to the photographer who would excel in his art is that which we would endorse. Let the photographer have his lens-chest as the carpenter has his tool-chest, as the mechanical draughtsman has his case of instruments, as the engraver has his selection of gravers, or as the painter has his selection of brushes, varying from the finest sable to the large hoghair tool and badger-hair softener. For portraiture, let him have a lens which gives sufficient definition over all the planes required, combined with softness; but let him remember that the lens which will give sufficient definition in this way for a picture with a two-inch head will not give sufficient crispness for cartes-de-visite. For reproductions, let him use lenses possessing the utmost sharpness. For architecture, the lens must have as much depth, frequently (especially interiors), as can be secured with crispness; and this may be secured generally by the use of a small stop, no great evil, since the building will not move; but it is imperative that the lens give true lines. For landscapes, depth of focus is often important, as well as crispness; and under the majority of conditions, which rarely render it necessary for the photographer to be too near even his foreground objects, he can, with several of the instruments now in the market, secure both qualities. Now that the subject of diffused focus is, thanks to Mr. Claudet, fairly under consideration, and its importance fully stated, we shall look for still greater facilities from the resources of the optician than, in the days when this was a tabooed subject, were ever dreamed of.

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PHOTOGRAPHING IN THE MAMMOTH CAVE.

BY CHARLES WALDACK.

According to promise, I now proceed to give you the result of my experience acquired with magnesium light during my second photographic excursion in the Mammoth Cave. As it would be too long and too tedious to give the history of each picture we took, I will limit my communication to general facts and conclusions.

The results we obtained, although satisfactory, do not possess the degree of excellence which I expected, and which I am fully confident can be attained under better conditions, and with implements better suited to the purpose than those we had in use.

I am also disappointed in the number of negatives we obtained. We found it impossible to make more than two or three pictures a day, the walk to the spot of operation, the studying-out of the picture, the disposition of the camera and reflectors, the focussing, the fixing of the magnesium in the reflectors, &c., taking up a considerable time. We also used a much larger quantity of magnesium to obtain a given number of negatives than we did during our first excursion, on account of attempting pictures of larger objects. It should be borne in mind that the rays of artificial light are divergent, and lose of their intensity in proportion as they go from the centre of illumination; thus, an object situated at forty feet will only be half as much illuminated as one of the same size at twenty feet.

In my first letter in the *Philadelphia Photographer*, I mentioned the fact that the reflectors or screens, supplied to us by the American Magnesium Company, threw the light at an angle much wider than that included on the plate; and I concluded from this that by using reflecters made concave, and with the sides extending further, much light would be gained, and pictures could be taken with a smaller quantity of magnesium; this I found, on trial, to be a mistake. These tin screens are very imperfect reflectors, and become much more so by a coating of the oxide of magnesium, which deposits on them as soon as the metal begins to burn. One monster reflector, thirty inches wide, and about forty high at the mouth, proved, however, much more effective than the smaller ones, on account of the surface remaining comparatively bright; and we many a time expressed a regret that all were not of such size. Our *pet* can be seen represented in the very imperfect stereograph of the *personnel* of the expedition ready to start on a two days' excursion. The great objection to it is its great size, which makes it very inconvenient to carry and drag through such narrow and low places as "Fat Man's Misery" and others. All lamps and apparatus in which the magnesium is burned slowly, and with more regularity than in the tin screens, are useless for Cave photography, for before all the magnesium required is burned, the picture is obscured by the smoke. We have even found it inconvenient, for this reason, to use the tapers twisted with iron wire, which take four or five times as long to burn up as the others, and have to run the risk of part of the magnesium melting and falling to the botton of the screens for the sake of giving short exposures; even then we could not get rid of the smoke entirely, as will be seen by the fogginess of parts of some of our pictures.

None of the lenses manufactured here or in Europe answer the requirements of Cave photography. The pair of Dallmeyer stereos we procured for the purpose we found, in general, better adapted to our use than the No. 2 carte-de-visite Ross lenses we used during our first excursion, on account of their including a wider angle, and of their bringing objects in different planes better in focus. The whole plate, short focus Voightlander, proved very deficient in this last respect, and was, therefore, in consequence, not used. The lenses which, I think, would be most suitable, should be of large diameter, so as to admit much light (of such a diameter as, for instance, Ross No. 3, or Dallmeyer's No. 2 carte-de visite lenses). The focus should be the same as Dallmeyer's stereos, so as to include the same angle. Lenses giving the same angle of view as the Globe might sometimes be useful; but in many cases it would be difficult to place the reflectors out of the field included on the plate. A third and most important quality lenses for Cave photography should possess, should be to divide the focus; this quality has hitherto been considered as a defect by opticians, inasmuch as it is obtained by an imperfect correction of the spherical aberration. The strongest magnesium light is so weak in its action on the sensitive film that the use of small stops has to be discarded, so that we have to be satisfied, either with having one plane in focus and the rest out of focus, or to sacrifice the extreme definition of one part to a fair definition of the whole. I had no opportunity to test Mr. Claudot's plan of moving the lenses or plate-holder during the exposure, as my attention had to be directed towards the proper lighting of the object; and that, besides dampness and sand, interfered with the easy motion of these parts.

The manufacture of lenses possessing this quality of dividing the focus has lately been urged by Wharton Simpson and others, and I see, by advertisements in the English photographic journals, that opticians have taken the hint. I have little doubt but that a lens possessing the requirements mentioned above can be manufactured; it would be a great boon, not only to subterranean photographers, but also to those who wish to make instantaneous pictures by natural light. I never felt the want of a very sensitive process more than when photographing in the Cave. A more sensitive collodion than the one I used, or a developer which would bring out a picture with a shorter exposure, would have greatly lessened our difficulties. Before starting, I made several samples of collodion according to different formulæ, and with different samples of cotton, but did not succeed in obtaining one which was more rapid than the one of which I gave the formula in my last letter. I also tried samples of different makers, all with the same results. This and my previous experience lead me thus to believe that extra sensitive collodion is a delusion, and that sensitiveness does not depend on the kind or quantity (within certain limits) of the iodides and bromides, provided the collodion be used *at the right time*. Some marvellous instantaneous pictures that one sometimes meets with are, I think, more the result of quick-acting lenses and a favourable condition of light than of ultra sensitiveness of the chemicals. The imperfections of the negatives we obtained are mostly caused by insufficiency of light. In some cases, the objects were too distant from the source of light; at others, they were of a brown or yellow tint, or covered with a mud or clay strongly coloured by iron. Such subjects as the last-mentioned present difficulties by sunlight; of that nature are a group of huge stalactites in Mammoth Dome, called the "Corinthian Columns." We succeeded, however, in getting a fair picture of them with ninety tapers.

The white gypsum formations in Cleveland's Cabinet, on the other hand, present less difficulty, and require less magnesium; these affect the form of roses, snowballs, rosettes, &c. We photographed them with the cameras tilted upwards; but the ceiling being only twelve or fourteen feet high, we only got good definition in the centre part of the picture. We hit upon an expedient, however, which allowed us to obtain a better result. One of the legs of the tripod was folded in so that it had only half the length of the two others; these were secured against moving by laying rocks on the ends. In this way we managed to get the camera pointing upwards at an angle of about thirty degrees from the vertical line. The subject of the picture was part of a ceiling covered with white gypsum, the principal object of which is a rosette about seven or eight inches in diameter, called the "Last Rose of Summer." Unhappily, we were unable to make use of the same dodge again, for on this picture, which proved to be an excellent one in most respects, we burned our last magnesium (twenty tapers).

Want of light, or insufficient exposure, is a source of many evils in photography. Under exposed negatives, no matter what care has been taken in cleaning the glass, are very apt to have a deposit in the transparent parts; this evil I always found less when using the English patent plate, but it was impossible to procure it here. The best French or Belgium glass, although quite good for negatives by natural light, cannot be cleaned well enough for making pictures which are comparatively under-exposed, or for subjects in which, owing to the method of illuminating, or to distance, are partly in gloom. The French polished plate would answer as well as the English patent plate if it was not so liable to break in the printing-frame; but having experienced its worthlessness in this respect, I did not feel inclined to use it for negatives which, in case of accident, would be difficult to replace. Certain parts of the Cave—such as the regions near Lethe and Echo Rivers, the Bottomless Pit, Gorin's and Mammoth Dome, &c.—are very damp; it takes but a short time for the dampness to permeate everything. The dusting-brush makes streaks on the glass; the slides of the plate-holders draw out with difficulty; the back-end of the camera does not obey the rack-and-pinion. Lucky you are if the water does not drop on your lenses, for you can find nothing dry to wipe them with. In the least damp of the places spoken of above, a sensitized plate was kept for twenty-four hours without drying, and the nitrate of silver crystallizing; it might probably have been left there for all time to come without changing in appearance. It did not occur to me at the time to try if its sensitiveness had been preserved, but I intend to do so at some future time. Working under such conditions proved very troublesome. No means of warming the plate; the whiskey sold at the hotel was so weak that it would not burn. A wood fire could not be made on account of the smoke, and our supply of alcohol was hardly sufficient to set fire to our magnesium. We managed finally to get some alcohol in Cave City. Having no lamp, we were obliged to burn it in a reflector, and dry the brush and warm the plate over it; this plan we adopted after this, even in the dry parts of the Cave.

On account of the dampness, and the sand and mud, which, whatever precaution was taken, would get in everywhere, we were obliged to take out, every evening, cameras, plate-holders, and glass boxes; these had to be dried before the fire, and cleaned before starting the next morning. The glass, owing to the difference of temperature in the Cave (about 59°) and outside, would, as soon as it was brought in the warmer medium, condense the moisture of the air, and the small particles of wood and dust coming from the box would stick to it, thus requiring to be cleaned again. To guard to some extent against dampness and sand, a bag of india-rubber cloth, to hold the cameras and plate-holders, would be useful; the seams should be made tight with india-rubber cement, and the bag closed tightly by means of a string.

If to all the inconveniences mentioned above, you add the bodily discomfort to which one is exposed in the climbing, creeping, and squeezing through all kinds of uncomfortable places, the fatigue of the march over rocky and slippery roads, loaded as one is with the implements of the profession, and, in some cases, the danger to life incurred in placing instruments and reflectors in the most suitable spots, you will agree with me that photographing in a cave is photographing under the worst conditions. Our trip over the river is one that I shall always remember. We started at nine in the morning—four of us — Messrs. J. Proctor and J. O'Shaugnessy. Abe (facetiously called our Man Friday), and myself, all loaded down with cameras, tripod-stands, chemicals, reflectors, and two days' rations. Passing the Giant's Coffin, Bottomless Pit, Scotchman's Trap, Fat Man's Misery, and the Dead Sea, we arrived at Lethe River, which we crossed in the boat. From there, passing over the "Long Walk," which at high water is submerged, we come to Echo River, which is from a half to three-quarters of a mile long. Through this we paddled, and passing to Silliman's Avenue, we came to Ole Bull's Concert Hall, of which we made two negatives; then, entering the rocky "Pass of Elghor," we stopped to make two negatives of "Hanging Rocks," and continued our journey until we reached Martha's Vineyard. Here we took supper, after which we went to look for a convenient place to pass the night; this we found, half a mile further, in a side avenue, very low at the entrance, but high enough a little further to stand up. We made our beds in the soft sand, and, wrapping ourselves in our blankets, soon went to sleep. At six in the morning rose for breakfast, and after this went immediately to work, making two pictures in Martha's Vineyard, two of the ceiling in "Snowball Chamber," two of some beautiful gypsum formations, two of the "Cross," and one of the "Last Rose of Summer." These spots are all the one near the other, which allowed us to do so much in one day; the furthest spot, the "Last Rose of Summer," is seven and a half miles from the entrance of the cave. About five o'clock we started on our homeward journey, and reached the entrance at eight. thus having passed thirty-two hours in the Cave. I must here acknowledge the valuable and intelligent help given me by Messrs. Proctor and O'Shaugnessy, the gentlemen who, engaged my services. They accompanied me on every trip giving me every assistance, and taking more than their share of the burdens and dangers. Without their help, I should often have been sorely puzzled, and should have given up taking many a picture of great interest. Although not photographers, they very soon came to understand the conditions necessary to success.

I will end my letter by giving you the *modus operandi* of producing a cave negative. Arrived at the spot of operation, two or three tapers are burned to ascertain the features of the picture; choose the place for the cameras (of which we generally use two), and decide from where the view has to be illuminated. We generally place two-thirds of the lights on the right hand side of the camera, and one-third on the left, or *vice versâ*, taking care not to have the reflectors too near it, so as to avoid flatness. Only when we cannot do otherwise do we place them on the same line of sight, and then we try to raise them as high as possible. The quantity of light required being determined, as also its direction, we get in focus on the principal object. When this is accessible, we place a lamp close to it, so as to illuminate the irregularities, on which, by means of an eye-piece, a focus is easily taken. Other lamps are disposed in the same way in different parts of the picture, thus allowing us to see which parts are sharp, and which are not, and suggesting the alterations to be made. This being done, we determine the exact locality of each reflector. The rule is to have the light as near as possible to the object, without allowing it to come in the field; if it does, a lamp placed at the intended spot will be seen on the ground-glass. The tapers are tied together at the top by means of a thin iron wire, at a distance from each other of half an inch; at the bottom they are tied in close contact. A rag dipped in alcohol is put in each reflector, and, at a given signal, is set on fire by means of a small piece of sponge also dipped in alcohol. The monster reflector holds from ten to twenty-five tapers; the small ones five to ten. We have used from twenty to one hundred and twenty tapers for one picture; some pictures would, with the means at our disposal, take a pound of magnesium.

As I said before, we generally use two cameras. The two plates are prepared rapidly, the one after the other; the plates are dried and slightly warmed before collodionizing. The pictures are developed and washed. I have given up redeveloping, on account of a greater liability to a deposit in the shadows. The fixing is done on our return. If any strengthening is required, I use sulphuret of potassium; if this does not bring the negative to the proper intensity, I pour over it a very weak solution of bichloride of mercury, which is followed by a very weak solution of hydrosulphate of ammonia. This method of strengthening requires extreme caution. I may, in some future letter, give you some more details on the subject of Cave photography.

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ON SULPHOCYANIDE OF AMMONIUM.

BY M. CAREY LEA.*

In two former papers devoted to positive printing, I examined the circumstances connected with the appearance of silver in the whites of albumen prints, and the effect of different printings and tonings on the permanence of prints. This paper, which forms the third and concluding one, divides itself into two parts. In the first, I have endeavoured to ascertain whether an old sulphocyanide bath, like an old hyposulphite bath, tends to make a weak print. In the second, I have examined the relative values of hyposulphite and sulphocyanide as fixers. The conclusions arrived at, especially on the latter point, are a good deal in opposition to received opinions, but will, I think, stand the test of criticism.

In an Appendix will be found the results of some experiments on the toxical properties of the sulphocyanide.

I.

We all know that a hyposulphite bath changes very rapidly by use, and then tends to produce a peculiar effect upon prints fixed in it, to which the name of "sulphuration" has been given. Whatever this effect may be, prints fixed in such a bath rapidly deteriorate by keeping, and will not stand the action of the nitric acid test which I have proposed for examining the permanence of positives. The question whether an old sulphocyanide bath acts in a similar way has never, I believe, been decisively fixed. It has, indeed, been said that such a bath is not altered by use; but this has, I believe, never been supported by a careful examination of the prints so fixed, or any observation as to what takes place in the bath itself.

1. Into a solution of hyposulphite of soda a drop of solution of nitrate of silver was let fall. A white precipitate was, of course, produced, which immediately redissolved; but a brownish colour was at once apparent through the solution, and at the end of twenty-four hours a black deposit was found in the bottom of the test-tube, probably sulphide of silver.

2. Similarly, a drop of solution of nitrate of silver was let fall into a solution of sulphocyanide of ammonium; a white precipitate was produced, which redissolved by agitation. At the end of twenty-four hours the liquid remained clear and colourless.

In these experiments the alkaline solvent was used in large excess. The conditions were now reversed.

3. Into a solution of nitrate of silver a small crystal of hyposulphite of soda was let fall. A permanent precipitate was formed, at first white, but soon darkening. At the end of twenty-four hours it was entirely converted into a shining black precipitate.

4. Similarly, a crystal of sulphocyanide of ammonium was let fall into a solution of nitrate of silver; the permanent white precipitate was quite unchanged at the end of twenty-four hours.

To render these trials more complete, it was thought advisable to examine the effect of a metallic chloride in the same comparative way.

Chloride of silver was precipitated from the nitrate by hydrochloric acid in excess. It was thoroughly washed, and divided into two portions, in two test-tubes, with a little water in each.

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* *Philadelphia Photographer.*

5. To one of these, crystals of sulphocyanide of ammonium were added in quantity not quite sufficient to dissolve the chloride of silver by agitation.

6. The same treatment, with substitution of hyposulphite of soda.

These tubes were at once placed in a dark closet, and were examined at the end of forty-eight hours. The chloride under the sulphocyanide was perfectly white; that under the hyposulphite had a brown layer on its surface.

It therefore appears that there is less tendency to decomposition in the case of the sulphocyanide.

The solvent powers of sulphocyanide of ammonium vary with the strength of the solution; a given quantity of sulphocyanide dissolves much less silver when dissolved in much water than in little. In order to fix the solvent capacity, the following experiments were made :—

Nitrate of Silver.—Thirty grains of nitrate of silver were dissolved in a small quantity of water; and it was found that a hundred and ten grains of sulphocyanide dissolved in five times its weight of water was a little more than sufficient to redissolve the precipitate which at first formed in it.

Chloride of Silver.—Thirty grains of nitrate were precipitated as chloride by hydrochloric acid, and were found to require, as might be expected, very nearly the same quantity of sulphocyanide. The chloride, however, naturally dissolved with less facility than the sulphocyanide of silver which the addition of the nitrate of silver to the sulphocyanide solution caused to be precipitated in the previous case.

It therefore appears that nitrate of silver may be taken as requiring approximately four times its weight of sulphocyanide of ammonium to insure its perfect solution, and the same for the chloride resulting from the decomposition of this quantity of nitrate.

In order to obtain a bath which should, as nearly as possible, represent the condition of a sulphocyanide bath after it had been in use a considerable time, the following measures were taken :—

A solution of sulphocyanide of ammonium was divided into four equal parts. One of these was saturated with nitrate of silver (nitrate was added as long as the precipitate redissolved by agitation). Another was saturated with freshly-precipitated chloride of silver. The remaining half was prepared as a fixing and gold-toning bath in the manner hereafter to be described. Finally, the portions saturated with the silver compounds, after standing seven days, in order that any decomposition tending to set in might develop itself, were mixed with the other. Thus, the whole bath fairly represented a fixing and toning sulphocyanide bath which had been for some time in use for toning and fixing prints thrown into it without previous washing, and therefore contained the whole of their free nitrate. I should state that this contained one ounce of sulphocyanide for every four measured ounces of bath.

Some prints were made upon paper sensitized with fifty-grain solution of plain nitrate of silver, with ten minutes' fuming with ammonia. These prints were then toned and fixed in the bath just described. A bath of plain sulphocyanide was kept at hand, through which to pass the prints before washing.

These prints were then cut to pieces, and portions of them were subjected to the nitric acid trial which I have already described. In every case they resisted perfectly the action of the acid. After a week's immersion, no lowering of density could be detected.

It seems a legitimate conclusion from this that the sulphocyanide bath does not, like the hyposulphite, tend to form mischievous compounds by use; on the contrary, it is perfectly free from this defect.

A word remains to be said on the tones given by this bath. In these last experiments, I have encountered a great tendency to redness in the half-shades, and also sometimes to a reddish discolouration of the whites. It was found that this last could be avoided by taking the prints out of the fixing and toning bath as soon as possible. When prints are thrown into this bath, they at first bleach very much, and pass to so pale a yellowish-brown colour that one would suppose them entirely destroyed. They soon, however, begin to gain greatly in force, and pass to a dark sepia brown. As soon as this point is reached, they should be thrown into the plain sulphocyanide bath. In this way the whites are perfectly preserved,

The reddish tones in the half shades would be a serious evil; but they are not in any way essentially connected with the use of sulphocyanide, as in some experiments, made a year ago, with the sulphocyanide fixing and toning bath, I obtained pure deep blacks with great facility. Experiment would probably have fixed the conditions under which desirable tones could be obtained; but, as in view of what follows, I do not think sulphocyanide is to be recommended in any form, it did not seem worth while to devote more time to this part of the matter.

II.

A careful examination was next made of the value, both absolute and relative, of hyposulphite and sulphocyanide simply as fixing agents. For this purpose, albumen paper was sensitized on a fifty-grain solution of plain nitrate of silver. It was then carefully washed to remove the free nitrate of silver; it was then cut to pieces, and treated in the following manner :—

1. A solution of hyposulphite of soda was prepared (the strongest usually employed in fixing positives, namely, one part of hyposulphite to four parts of water.

2. A solution of sulphocyanide of ammonium was prepared of the strength usually directed, namely, one part of sulphocyanide to two of water).

Pieces of the prepared paper were placed in these solutions, and left in them for five, ten, fifteen, twenty, and thirty minutes respectively, during which time they were frequently agitated. Before throwing them into the washing-basin, the papers treated with sulphocyanide were all duly passed through a second solution of sulphocyanide.

All these papers, after having been thoroughly dried in the dark, were placed under a very dense black and white negative, and were exposed to the sun for five or six hours, and for about an equal time to diffuse light. The result of this was unexpected and very curious. *Every* paper treated with hyposulphite had been perfectly fixed; even the one which had been but five minutes in the solution showed no signs of an image.

On the other hand, every piece fixed with sulphocyanide showed a distinct image; even the piece which had remained as long as half-an-hour in this very strong solution showed a perfectly plain image of the negative.

I think, therefore, that whilst the sulphocyanide of ammonium has the very well-marked advantage that it does not, by its decomposition, tend to compromise the blacks of the print, it is, at the same time, incapable of removing the sensitive compound from the lights. I am at a loss to imagine how this has passed so long unnoticed. It is true that the sensitive compound left is not capable of more than a slight darkening by light.

In concluding this series of papers on the subject of positive printing, it may be worth while to state the points which seem to have been settled by it :—

1. Where fresh hyposulphite is used, the print is reasonably permanent, whether it has been fixed and toned separately, or at one operation.

2. Sulphocyanide of ammonium is not decomposed in the operation of fixing prints in such a way as to injure them. The only effect of use seems to be a simple diminution of its powers; and there seems no reason to believe that by the use of an old bath any effect would be likely to be produced upon prints in any way analogous to what is called sulphuration.

3. Developed prints, even when toned with gold, give little promise of permanency; and it is probable that, sooner or later, they will all fade, no matter how well and how carefully the operations have been performed.

4. Hyposulphite of soda will thoroughly fix a picture. Under favourable circumstances, the operation is complete in five minutes. Some silver is still left in the whites, but not in a condition sensitive to light.

5. Sulphocyanide of ammonium fixes so imperfectly as to leave a sensitive compound behind, even when used in very concentrated solutions. No prolongation of its action is effective; its power seems to be spent in a few minutes, after which it accomplishes nothing further.

6. The nearest approach to a complete removal of silver from the whites takes place where the print is allowed to remain for a considerable time in a toning and fixing bath. In some cases, this may extend so far that a solution of alkaline sulphide fails entirely to detect the presence of silver. Nevertheless, the use of the toning and fixing bath is not to be recommended, because tetrathionate of soda is rapidly formed in it, and prints toned in a bath when in that condition are very defective in permanency; nor can such a bath be improved by the addition of gold and of fresh hyposulphite.

APPENDIX.

INFLUENCE OF SULPHOCYANIDE OF AMMONIUM ON THE ANIMAL ECONOMY.

In view of the fact that this substance has been largely manufactured with a view to photographic use, and that the most varying accounts have been given of its toxical effects, it seemed to me desirable, in order to complete this investigation, that some experiments should be made on its hygienic relations.

Although sulphocyanide of ammonium contains the radical cyanogen, it does not necessarily follow that it must have the poisonous influence of simple cyanides; for the cyanogen may be so combined as to be completely innocuous. This is seen in the ferrocyanide, or yellow prussiate of potash, a substance which is formed by the union of iron with cyanide of potassium, and which is so innocuous that it may be swallowed with impunity. I was even informed some years ago, in Paris, by the distinguished pharmaceutist, M. Mialhe, that it had been tried as a form of administering iron, but was found to pass through the system unchanged.

It could not, therefore, be argued *à priori* that this compound should or should not be poisonous, and authorities seem to be divided on this subject. It has been said to be innocuous, on the one hand, and on the other has been pronounced to be a narcotic poison. The following experiments were made to fix this point:—

Ten grains were given in milk to a rather large and strong (worthless) dog. No effect was observed to follow.

Twelve hours after, a further dose of twenty-five grains was given in the same way. An hour or two afterwards the dog seemed sick, was drowsy, and yet very restless, with a peculiar expression in the eyes; was uneasy, and frequently looked at his hind quarters. This effect gradually passed off; and when the animal's feeding time came, about six hours after the dose was ingested, he ate with his usual appetite, and continues to be well.

I am aware that we cannot reason with entire certainty from the dog to man, and that certain medicinal substances act differently on the two. Calomel, strychnia, and turpentine are very noxious to the canine race, acting far more powerfully than on man; whilst of aloes a dog will bear a dose that would kill a man.*

Nevertheless, the general action of drugs is apt to be the same in both cases, varying for the most part but a little in relative intensity.

I think, therefore, that we are justified in concluding, from the foregoing, that whilst sulphocyanide of ammonium may be a poison, it is certainly not to be ranked beside cyanide of potassium, and that it may be handled with comparative impunity. More than this it would scarcely be safe to affirm.

PHOTOGRAPHIC THEORIES—THE ACTION OF LIGHT ON IODIDE OF SILVER, ETC.

(An abstract of remarks made by Professor Seely, at the Photographical Society, October 8th.)

Nearly a century ago it was observed that nitrate of silver and chloride of silver were not promptly blackened in the light, unless they were at the same time in contact with moisture and organic matter. It was held that if these salts be kept quite pure and dry, they would not change. The early chemists, moreover, fortified their theory by a good experiment; they exposed chloride of silver in vacuo, over sulphuric acid, and found that it did not perceptibly change. I am not aware that the theory has ever been assailed, although it should not be considered impregnable.

The action of light with moisture on chloride of silver, although plainly a reducing action, never leaves the silver in the metallic state. In this case only a part of the chloride is liberated; and as the use of the balance was impracticable, the amount was agreed upon by the assistance of general principles of chemical action. It was held that the chloride of silver, so far as it is exposed to light, loses one-half its chlorine, and becomes sub-chloride of silver.

So far, all these doctrines were maintained before we had any art of photography, and I believe at the present time they are still in force. We have added, in our day, very little, if anything, of fact or argument which is pertinent to the subject. We have shown in the practice of the Daguerreotype that chloride of silver in contact with metallic silver goes into a sub-chloride. But that is a fact which is so plausible that it might have been anticipated, and I think it likely that Sheele himself knew as much as we do about it.

In 1812 iodine was discovered, and in 1826 bromine, and we had, just in good season for photography, the wonderful triad, chlorine, bromine, and iodine. The similarity of properties of these elements has been the study and admiration of all chemists. It is so well recognized now, that in some arts these elements are regarded as equivalents; and in many scientific investigations, if a property be proved of one, it is assumed of the others. In their comportment to other substances and forces they are almost identical. What differences there are between them are only of degree. Sir Humphrey Davy would have understood the case well, had he been told that there were such mates for chlorine as sodium is for potassium. It would have been said in advance of experiment, that bromide and iodide of silver would be similar to chloride of silver, and that all would act in the same way under the action of light. Of course, differences were to be anticipated, but the burden of proof was plainly upon those who claimed specific differences; until they are demonstrated, it may be assumed that they do not exist.

It appears that a question has been raised, whether pure or isolated iodide of silver is sensitive to light. In making attempts to settle this question by experiment, care should especially be taken to isolate the iodide from those substances which are well known to render chloride sensitive to light, as, for example, organic matter and moisture. I think it must be evident that experiments made without such care are worthless; that iodide of silver spread on paper or through a collodion film or on glass, is by no means the iodide of silver which the question calls for. I am aware that many experiments have been made in the view of answering the question, but I am sorry to say that none of these are pertinent. We have always supposed that iodide of silver is sensitive to light in presence of organic matter and moisture, and we are yet to hear of an experiment where either of them were eliminated. We should begin our tests on fused iodide of silver, or precipitated iodide in vacuo over sulphuric acid.

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* "Youatt on the Dog." Lewis's edition, pp. 178, 179.

An incorrect inference has been made by some persons, from the well-known fact that iodized paper is practically insensitive to light. It was assumed, for example, that the iodide of the paper was sufficiently pure iodide of silver, and that ordinary photographic experience was sufficient test of sensitiveness.

Happily, the question of the effect of light on isolated iodide of silver, in the present state of our art, has no application. We never use the isolated iodide, and probably shall never be able to use it.

How compounds of silver are changed in our actual work is of more consequence, and is a question which is probably capable of solution. In my opinion, the Daguerreotype furnishes the key to all the mystery. In that process the iodide of silver gives up a portion of its iodine to the substratum of metallic silver, and there remains a sub-iodide of silver which has the property of receiving the mercury, and thus rendering the image visible. In other processes—as the Talbotype and collodion processes—we substitute for the metallic silver, organic matter, moisture, and nitrate of silver. One or all of these substitutes, when aided by light, have the property of reducing iodide of silver to the condition of a sub-iodide, and this last, in the presence of the developer, is reduced to metallic silver.

The objection to this theory, when appplied to the collodion process, is, that the image ought to be visible before the development. To this it may be replied that the greatest part of the silver of the developed image does not come directly from the sub-iodide, and is not proportioned to it; the silver which comes from the sub-iodide serves only as a nucleus for the great body of the silver precipitated from the nitrate; the amount of the sub-iodide may therefore be supposed to be so small as to escape notice hitherto. The sub-iodide of silver, it should be observed, does not greatly differ in colour from the iodide, and it may be that in the collodion process, by reason of the combination with it, or presence of organic matter, the visible difference is still less. If the invisibility of the image is an insuperable objection in the mind of anyone to what is called the chemical theory, it may be conceived that under the action of light, the iodide goes into an isomeric condition, when, by the presence of the developer, the action can be completed.

I have spoken of the organic matter, nitrate of silver, and moisture of the collodion process, as substitutes for the metallic silver of the Daguerreotype. Of these, the organic matter is now the most worthy of study. The term has great indefiniteness. We know that the difference in the action of such crude and complex materials as collodion, albumen, and the empyrical matters of the dry processes, are very great; but no one yet knows what the simple organic ingredient is, which now favours sensitiveness and now intensity, and other properties. The great future progress of photography lies in the discovery of the exact facts connected with the use of organic matter in our sensitive preparations.

The man who first isolates the substance of collodion which exalts sensitiveness will deserve a place with the fathers of photography.

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CURIOUS HISTORY OF A DRY PLATE.

Prof. Towler relates a curious experiment with a dry plate. He says:—Having occasion to pay a visit to a friend in the country, we took our changing-box, camera, lens, and tripod, in order to be prepared for an emergency. The opportunity to try a plate was soon presented; our faithful horse was also glad to have an opportunity to examine the scenery at ease, whilst the tripod was being fixed up and other matters were arranged. In short, we exposed a plate for three minutes, and had to stand before the camera, in order to prevent the wind from blowing down the door in front of the lenses. This, of course, was poor weather for any sort of plate; but all that we wanted was the stereograph of the residence of one of our friends, and we did not care much about his shrubbery.

The next day the plate was submitted to the developing operation. Did you ever develop a plate by Gordon's process? Your patience will be tried at the beginning; but never mind, perseverance will crown all your efforts with satisfactory results.

The plate lay in the plain pyrogallic acid solution for ten minutes. Not a trace of any residence was visible, not even when we mounted a powerful pair of spectacles. We waited ten minutes longer, but to no purpose. It was now lecture time, and consequently the plate was left to its fate until we returned in an hour-and-a-half. There was still no trace of a picture. We now begun to think that the plate had been exposed on the bare glass; nevertheless, the plate was left over night in the solution. Things were in the same condition the next morning; but the collodion film was quite white or unstained, and the solution still colourless. The plate was washed, dried, and then exposed on a neighbouring church with chesnut trees in full foliage on one side. The light was bright; the exposure again three minutes.

A fresh solution of pyrogallic acid was prepared; every caution was taken to secure good results; but, alas! no picture appeared in two hours. The plate was still white, unstained, and the solution colourless.

What was to be done? It was too bad to throw aside a plate which apparently was irreproachable.

We washed the plate, and were determined on something violent in practice. The plate was put on the dipper, and lowered into the silver solution for two minutes, after which it was taken out and put in the plate-holder; and we exposed the plate for fifteen seconds as an ordinary wet plate on the houses, lake, and pier below the laboratory.

This time we used the iron and gelatine developer, such as we always use now for wet plates.

Soon we descried traces of a building—it was the residence of our friend in the country—then came the church steeple, the Gothic windows and the chesnut trees, and, finally, the pier, the elevator, the lake, and the northern horizon of the village; three phantom pictures mingled and superimposed, but each one was distinctly developed for further intensification if it had been thought necessary.

Since then we have developed according to Gordon's plan, until the picture was complete in detail, and almost half finished. We then fixed, washed, and afterwards immersed the plate in the silver bath. After the plate had drained well, we then poured over the film the iron developer, which intensified the picture very rapidly and vigorously, a little too vigorously unless the operation be performed with extreme caution.

As soon as we can get time, we intend to prosecute this interesting subject, and shall endeavour, if possible, to evolve some simple and reliable mode of developing dry plates in the direction here suggested.

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Proceedings of Societies.

Amateur Photographic Association.

Award of the Prizes.

The adjourned Meeting for the award of the prizes was held November 16th, at 12, York Place, Portman Square, the Right Hon. the Viscount Ranelagh, Vice-President, in the chair. The minutes of the last Meeting having been read and confirmed, Mr. Glaisher laid before the Council a most elaborate report, of which the following is an abstract:—

The pictures contributed this year by the members of the Association, which exceed by about one-half those of any previous year, are as follows:—

Class 1 contains 157 pictures, contributed as follows:—

Capt. Geo. Bankart, 25; Capt. P. A. Elphinstone, 22; Lieut.

H. J. Senior, 13; Col. Biggs, 11; Major Munn, 9; T. Pryce, Esq., 6; H. Cooper, Esq., jun., 4; W. D. Howard, Esq., 4; the Hon. Leslie-Melville, 3; Mrs. J. C. Ryle, 3; Dr. Hemphill, 3; Capt. Mason, 3; J. W. Richardson, Esq., 3; W. S. Hobson, Esq., 3; J. S. H. Moss, Esq., 3; W. Sanday, Esq., 3; Capt. Napier, 3; W. H. Harton, Esq., 2; T. Paget, Esq., 2; Rev. F. E. Gutteres, 2; Dorabjee Pudumjee, 2; R. Murray, Esq., 2; F. E. Currey, Esq., 2; F. Beasley, Esq., jun., 2; Sir J. J. Coghill, Bart., 2; G. Bevington, Esq., 1; M. Allport, Esq., 1; Miss C. Powell, 1; A. Beatty, Esq., 1; S. W. Williams, Esq., 1; D. Laurie, Esq., 1; Rev. H. Holden, 2; F. K. Barclay, Esq., 1; F. Meyer, Esq., 1; J. Pall, Esq., 1; C. Stephens, Esq., 1; Lady Matheson, 1; J. C. A. Bones, Esq., 1; A. Impey, Esq., 1; J. A. Jebling, Esq., 1; T. Brownrigg, Esq., 1; the Countess of Uxbridge, 1.

Class 2 contains 202 pictures, contributed as follows:—

Major Munn, 26; Lieut. Senior, 20; Capt. Elphinstone, 16; Col. Biggs, 14; Capt. Bankart, 9; T. Pryce, 9; Capt. Mason, 9; W. S. Hobson, Esq., 6; F. E. Currey, Esq., 6; H. Cooper, Esq., 5; W. D. Howard, Esq., 5; Dorabjee Pudumjee, 4; F. Beasley, Esq., 4; D. Laurie, Esq., 4; the Hon. Leslie-Melville, 3; Dr. Hemphill, 3; J. S. K. Moss, Esq., 3; Miss C. Powell, 3; C. Stephens, Esq., 3; J. A. Jebling, Esq., 3; W. S. Hunter, Esq., 3; B. Jones, Esq., 3; Mrs. J. C. Ryle, 2; Rev. F. E. Gutteres, 2; J. W. Richardson, Esq., 2; W. Sanday, Esq., 2; Capt. Napier, 2; R. Murray, Esq., 2; Sir J. J. Coghill, Bart., 2; A. Impey, Esq., 2; W. T. Hall, Esq., 2; W. Jeffreys, Esq., 2; Rev. J. Freke, 2; Rev. H. Holden, 1; F. K. Barclay, Esq., 1; J. Bell, Esq., 1; T. Brownrigg, Esq., 1; A. Gray, Esq., 1; W. L. Banks, Esq., 1; R. P. Bowman, Esq., 1; R. H. Mitchell, Esq., 1; W. H. James, Esq., 1; J. Wales, Esq., 1; Col. Holder, 1; W. H. Harton, Esq., 1; S. Bevington, Esq., 1; W. L. Banks, Esq., 1.

Class 3 contains 192 pictures, contributed as follows:—

Major Munn, 31; Lieut. Senior, 27; Capt. Napier, 10; W. D. Howard, Esq., 10; Col. Biggs, 9; Capt. S. Baukart, 6; T. Pryce, Esq., 6; W. S. Hobson, Esq., 6; Rev. H. Holden, 6; Capt. Mason, 4; Capt. Elphinstone, 3; J. W. Richardson, Esq., 3; Dorabjee Pudumjee, 3; R. Murray, Esq., 3; Miss C. Powell, 3; S. W. Williams, Esq., 3; W. S. Hunter, Esq., 3; the Hon. Leslie-Melville, 2; W. H. Harton, Esq., 2; J. S. K. Moss, 2; F. E. Currey, Esq., 2; J. Bell, Esq., 2; W. T. Hall, Esq., 2; W. Jeffrey, Esq., 2; J. Wales, Esq., 2; J. H. Ritchie, Esq., 2; J. Middleton, Esq., 2; J. A. Bells, Esq., 2; Miss Ramsden, 2; T. Paget, Esq., 1; Mrs. J. C. Ryle, 1; G. Bevington, Esq., 1; M. Allport, Esq., 1; W. Sanday, Esq., 1; D. Laurie, Esq., 1; F. K. Barclay, Esq., 1; Lady Matheson, 1; A. Impey, Esq., 1; T. Brownrigg, Esq., 1; A. Gray, Esq., 1; W. L. Banks, Esq., 1; R. B. Bowman, Esq., 1; W. H. James, Esq., 1; Miss Campbell, 1; Mrs. Daulceny, 1; Lady Lavinia Dutton, 1; W. G. Athsrstone, Esq., 1; R. H. Mitchell, Esq., 1.

Class 4 contains 141 pictures, contributed by W. H. Price, Esq.; J. J. Cotton, Esq.; E. R. Hall, Esq.; F. R. Griffith, Esq.; T. R. Lane, Esq.; Col. Halpin; Dr. Wilson; R. H. Mitchell, Esq.; and the members already mentioned.

Class 5 contains a very large number of pictures, many of which are very good, but which it is impossible to mention separately.

Some idea of the progress of the Association may be gathered from the following list of pictures contributed during the last four years:—

Class 1 1863 contained 30 pictures
,, 1 1864 ,, 49 ,,
,, 1 1865 ,, 85 ,,
,, 1 1866 contains 159 ,,
Class 2 1863 contained 82 ,,
,, 2 1864 ,, 109 ,,
,, 2 1865 ,, 106 ,,
,, 2 1866 contains 202 ,,
,, 3 1863 contained 176 ,,
,, 3 1864 ,, 132 ,,
,, 3 1865 ,, 123 ,,
,, 3 1866 contains 191 ,,

In Classes 4 and 5 the pictures exceed, by nearly one-half, those exhibited any previous year.

The following prizes were awarded:—

First Prize.

Capt. G. Baukart, for a pair of pictures 12 by 10, Nos. 107 and 112, "Under Clifton Grove, Notts"—a pair of silver goblets.

Second Prizes.

Capt. G. Bankart, for a pair of pictures 12 by 10, Nos. 83 and 87, "On the Trent," and "Wilford Green"—a large silver goblet.

Lieut. H. W. Senior, for a pair of pictures 10 by 8, Nos. 95 and 1[illegible]1, "The Golden Temple and City of Amritsur," and "Fort Attock on the Indus"—a large silver goblet.

Col. Biggs, for a picture 16 by 12, No. 57, "Banyan Tree near Belgaum"—a large silver goblet.

Major Munn, for a pair of pictures 7 by 6, Nos. 71 and 81, "Wooden Bridge, *viâ* Malta," and "Robber's Castle, *viâ* Malta"—a silver goblet.

W. D. Hemphill, Esq., M.D., for a picture 12 by 10, No. 79, "Lady Blessington's Bath"—a silver goblet.

Capt. P. A. Elphinstone, for a pair of pictures 7¼ by 4¼, Nos. 1 and 15, "Indian Mode of Irrigation" and "The Wounded Antelope"—a silver goblet.

W. D. Howard, Esq., for a picture 9 by 7, No. 59, "Lœrdalsoren, Norway"—a silver goblet.

T. Pryce, Esq., for a pair of pictures 10 by 8, Nos. 22 and 36, "On the Tjiliewoeng River, Batavia," and "On the Tjikamckie, Batavia"—a silver goblet.

T. Cooper, Esq., jun., for a picture 11 by 9, No. 21, "'Tis twilight, yet [illegible] come"—a silver goblet.

T. Paget, Esq., for a picture 9 by 7, No. 2, "Bridge over the Avencon, Switzerland"—a large photographic album, elegantly bound in morocco, with silver plate.

G. Bevington, Esq., for a picture 10 by 8, No. 57, "Winter Friends of the Prickly Fern"—a large photographic album, elegantly bound in morocco, with silver plate.

F. E. Currey, Esq., for a picture 9 by 7, No. 24, "Irish Cross at Kilkieran"—a large photographic album, elegantly bound in morocco, with silver plate.

M. Allport, Esq., for a picture 10 by 8, No. 16, "Ferns, &c., Tasmania"—a large photographic album, elegantly bound in morocco, with silver plate.

Capt. Napier, for a picture 7¼ by 4¼, No. 1, "Aden, looking South"—a photographic album, handsomely bound in morocco.

D. Laurie, Esq., for a picture 7¼ by 4¼, No. 47, "On the Cree"—a photographic album, handsomely bound in morocco.

Dorabjee Pudumjee, for a picture 9 by 7, No. 7, "Mango Tree in Nulla"—a photographic album, handsomely bound in morocco.

Capt. Elphinstone, for a pair of pictures 7¼ by 4¼, Nos. 13 and 2, "Hook Swinging at Pattroorda," and "Group of a Village Community in Berar"—a photographic album, handsomely bound in morocco.

Stereoscopic Prizes.

W. H. Harton, Esq., for a pair of pictures Nos. 4 and 8, "Pagoda in the Woosung, Shanghea," and "Shanghea Tea Gardens"—a photographic album, elegantly bound in morocco.

Capt. Mason, for a picture, No. 270, "A Betel Nut Plantain, Krishnapoor"—a photographic album, elegantly bound in morocco.

Dry Plate Prize.

R. Murray, Esq., for a picture 11 by 9, No. 10, "Richmond, Yorkshire"—a photographic album, elegantly bound in morocco.

Certificates of Honourable Mention were awarded to Capt. Baukart; Capt. Elphinstone; Lieut. Senior; Major Munn; Col. Biggs; T. Pryce, Esq.; the Hon. Leslie-Melville; H. Cooper, Esq., jun.; W. D. Howard, Esq.; Mrs. Ryle; Dr. Hemphill; Capt. Mason; Rev. F. E. Gutteres; J. W. Richardson, Esq.; W. S. Hobson, Esq.; J. S. K. Moss, Esq.; W. Sanday, Esq.; F. Beasley, Esq.; F. K. Barclay, Esq.; T. Brownrigg, Esq.; Rev. H. Holden; the Countess of Uxbridge.

A. J. Melhuish, Hon. Sec.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 28th November, 1866.

I learn from the last number of the Photographic News that the English photographers who intend to exhibit in 1867 are not only still less advanced than their brethren here in France, but also that great uncertainty prevails among them as to the measures they will have to take for that purpose. In my capacity as delegate of the French photographers, I have had to devote special attention to the interests confided to me; but with all my good will I am not able to supply you with any precise information on the question which now embarrasses you. I must say, however, that I am greatly astonished to find that you have not yet received any precise communication, either from the Imperial Commission, or from one of the English Commission, whose duty it is to attend to the interests of their countrymen. The said Commissioners have doubtless received, as we have, all the circulars and instructions of the Commission relative to the date for the sending of the proofs, to the mode of examination adopted by the jury of admission, and to the reception at the Palace of proofs in frames, &c. How all these matters can have been left unexplained till now is to me quite incomprehensible.

The foreign commissioners appear to me to have been appointed to exercise the same functions as the delegates in France. We are the voluntary and gratuitous agents of the photographers of Paris and the provinces. Have not the commissioners the same duties with you? What especially induces me to think so is that, in 1855, the interests of English photography were confided to Mr. Thurston Thompson, one of the English Commissioners, if I am not mistaken. Why should it not be the same on the present occasion?

However, in order to remove all doubt on this point, I will readily undertake to present the different questions you propound in the Photographic News to the Commissioner-General, and to transmit you his answers.

I am very anxious to be able to send you some positive information respecting the leptographic process, which is also noticed in your last number. Unfortunately, the mode of preparation is a secret, and we have not even the resource of consulting the text of the patent. All I know is, that the paper receives a first dressing, on which, when dried, a coat of sensitized collodion is applied. Is it collodio-chloride of silver? I cannot answer this question certainly, but, whatever it may be, the proofs taken on this paper sufficiently prove the superiority of the preparation. I send you enclosed a specimen of the paper, which I hope you will receive without its being very much affected by the light; but I am bound to apprize you that this specimen is part of a series of sheets less perfect than usual, owing to an accident.

All the tonings commonly employed have given the same satisfactory results, but recent experiments have led the Leptographic Company to employ the sulpho-cyanide of ammonium as preferable to the hyposulphite of soda, the former being a better guarantee for the stability of the proofs.

M. Marion has just sent me some specimens of his negative paper, collodionized, iodized, and waxed. I send you a piece inclosed.

This paper is employed either dry or humid; in the former case the silver bath is composed of

Distilled water	...1000 grammes
Crystallized nitrate of silver ...	70 ,,
Glacial acetic acid ...	... 100 ,,

In the second case, the paper is merely floated on a solution of

Water	... 100 grammes
Nitrate of silver ...	... 10 ,,
Acetic acid	... 10 fluid grammes.

After being sensitized, the sheet is washed repeatedly in a basin of distilled water.

The development of the image is effected by means of pgyroallic acid, with the addition of eight or ten drops of aceto-nitrate to 100 grammes of liquid. Great care must be given to the development, which takes more or less time according as the sitting has been more or less prolonged. The proof is then taken out of the bath and plunged in water. For fixing, the hyposulphite bath at 20 per cent. is used. After about half-an-hour, which is the time required to dispel the yellow opaque tint of the paper, the proof must be washed for about as long, and then hung up to dry. The washing and drying must then be repeated, and the wax afterwards revivified by holding the sheet before a rather brisk fire.

The Marseilles Photographic Society has resumed its sittings, and I believe you have already received a report of what took place at the first. **Ernest Lacan.**

THE INTERNATIONAL EXHIBITION.

Sir,—As you appear to be anxious to assist English photographers to make a good display in Paris, will you allow us to state the reason why we do not intend to exhibit?

We applied for 100 feet of wall space, and had allotted fifteen feet. We complained to the authorities at Kensington, and said that unless they could give us more space we should not exhibit. We received a reply, that the allotment of space had been entrusted to the London Photographic Society, and they could not, therefore, alter the decision.

The London Society no doubt thought fifteen feet of wall space quite sufficient for a provincial house; we do not, however, endorse their view, and could not permit ourselves to be placed in so invidious a position.—Yours respectfully,

T. and J. Holroyd.

Esplanade House, Harrogate, November 26th, 1866.

[The difficulty of the Committee apportioning space was a serious one. They had only about one-fifth or one-sixth of the space at their disposal, for which they had demands, and all applications had to be cut down. We believe that their labours were conducted with impartiality, but possibly with an imperfect knowledge, in some instances, of the merits of the respective claimants.—Ed.]

LONDON DEALERS AND COLONIAL PHOTOGRAPHERS.

Sir,—I enclose a few photographs, and shall feel obliged if you will give me your opinion of the capabilities of the lens with which they are taken. This lens is a triplet of 8-inch focus, by a maker of considerable repute, and is stated in his catalogue to be capable of covering 8 by 4½ inches. I ordered the lens of this size that I might be sure of its covering 7½ by 4½. I thing it is pretty obvious that it does not perform its advertised duty, and that it does not cover even 7½ by 4½. If you are of this opinion, will you be good enough to advise me how to obtain redress?

I cannot help complaining that Cape photographers are very badly treated by dealers in England; it is not my complaint only, but that of professional photographers also. I will justify my complaint by giving a few instances, none of which are trifling, most very annoying and inconvenient. Out of nine dozen plates which were ordered to be flatted crown, only six (not six dozen) were fit for use; every one of the rest was worthless, from its great curvature and unequal thickness. Glass cutting shapes, which are advertised for 7½ by 4½, were sent of exactly that size, making no allowance for cutting off edges or corners from negatives resting on wire; further, the shapes were not true, and this is an abominably dishonest fault in a triangular shape. Mounts ordered for the same size were sent with an opening 8 by 4 5-8ths. Tinted mounts had a margin of two inches on one side and three on the other. Even cameras and lenses ordered from catalogue are not sent according to order. Are we treated in this way because the dealers know we have no redress, or is it the universal practice to send to the Colonies that which is unsaleable in England? I know that very much that is damaged and refuse comes out here. You seldom find an article that has not some flaw, great or slight, in it.

Spoilt copies of books and periodicals, showy and trashy goods; and almost all the crockery that should be circular, has in reality the form of very irregular polygons, or else the pattern is defective.

It would be a great advantage to us if advertisers would give the prices of their wares. There are no tradesmen here who keep all photographic requisites, or even a tenth part of them, in stock, and most of what we want has to be ordered direct from England.

If your opinion of the lens agrees with mine, I shall esteem it a favour if you will insert this letter.—Yours faithfully,

Cape Town, October 16th, 1866. Sutor Ultra Crepidam.

[We insert our correspondent's letter, in order that it may meet the eyes of those whom it may concern. It would appear that he has probably been especially unfortunate; but although we can conceive that occasionally, amongst unscrupulous traders, damaged or inferior goods may be sent to Colonial customers, we can scarcely conceive it to be a general practice. Apart from considerations of morality, it would be suicidal. A dealer in photographic materials, sending out one consignment of goods, hopes to send many more; and he cannot expect to do that if he intentionally palm off rubbish on his customers. The suggestion as to adding the price of articles in their announcements we commend to the attention of advertisers.

Regarding the lens, we think our correspondent is a little exacting. In speaking of a lens "covering" a given size, it is not necessarily meant that every portion will be equally and perfectly defined unless a small stop be used. Taking into account the length of focus and the size of aperture used, and the nature of the subjects chosen, we cannot pronounce the definition faulty, as shown in the pictures sent. In some of these the lens is at right angles with a straight stone wall in the foreground, stretching the whole length of the picture; and in a print 6¾ inches long, taken with a stop of 7-10ths aperture, the definition falls off very little indeed to the edges. In the 8-inch pictures the definition falls off more, but not seriously, considering the aperture used. They are a little under-exposed, which makes the effect look worse. It is no part of our duty to vindicate the optician, if a fault existed; but we wish to reconcile our correspondent to his instrument, by showing him that his disappointment is rather due to expecting too much than to receiving too little.—Ed.]

SILVER IN THE WHITES OF ALBUMEN PRINTS.

Sir,—In your last, a letter appears from Mr. Carey Lea in answer to a communication of mine which appeared in your columns on the 28th of September, in which I ventured to say that Mr. Lea had done me the honour to repeat a series of experiments I had published, without the grace of referring to them. He complains that my communication was an "angry" one. On this head I will simply remark, that I had no such feeling as that he ascribes to me, and I will refrain from retorting a similar imputation, which might easily be done. The subject, and all connected with it, possesses sufficient scientific interest for re-discussion, apart from personal considerations. As I purpose shortly giving a *résumé* of the present state of the question, I will not treat of it at length here, but merely remark that, in regard to the mention of it by MM. Davanne and Girard, I fully entered into that question in an article published in the Photographic News, 6th February, 1863.

My complaint—if a dispassionate mention of a fact can be called a complaint—against Mr. Lea was, that he repeated my experiments in detail, stating my results in almost my own language, without the slightest acknowledgment. MM. Davanne and Girard mentioned a circumstance without entering into an estimate of its consequences, and so incidentally that it did not receive recognition as an important fact. I made a tolerably complete series of experiments without, at the time, any knowledge that the eminent French authors had mentioned the subject. Had I known they had done so, I should unhesitatingly have recognized it. Mr. Lea, on the other hand, was manifestly so familiar with my labours, that he repeated them with scarcely alteration or addition, but *did not* mention them. There is, moreover, this singular anomaly, that he referred to the presence of silver in the whites as a "fact only lately ascertained," proving that his knowledge, at least, of the matter was recent; whereas he now speaks of it as something definitely announced upwards of seven years ago! In the history of an art a quarter of a century old, seven years ago can scarcely be called "lately," and the phrase induces one to think that Mr. Lea has fallen back upon an *ex post facto* defence.—I am, sir, yours, &c.,

John Spiller.

Chemical Department, Woolwich, Nov. 27th, 1866.

Photographic Notes and Queries.

Washing Prints.

Sir,—I was pleased with the description of a new washing machine, by J. M. Young, in the News of November 16th. He says any plumber will make it for 7s. 6d. Is the india-rubber pipe included? Does any one make them at the price quoted? Who?

Some parties recommend that the prints be hung up to drain several times, being changed to fresh water again. Which way do you think most satisfactory?

You see, we poor plodding photographers in small places are not favoured with water-works; consequently, all has to be pumped, and carried in buckets to the washing place.

J. M. Young might have said how much water was required for a given time.

How much do the half-inch feed (india-rubber) pipes cost per foot?

Would you kindly answer this week, as I want to decide about it. I am a regular "subscriber," if not a "regular troubler." "Photor."

Alford, November 27th, 1866.

[Perhaps Mr. Young will answer our correspondent's queries as to the machine. The plan of alternate washing and thorough draining is one of the very best for securing perfect washing. —Ed.]

Talk in the Studio.

Artificial Ivory.—There is no artificial product which has been more anxiously sought for in the arts than a substitute for ivory, but hitherto without complete success. An artificial ivory (we learn from the *Builder*) is now made in France from a paste of papier maché and gelatine, to which the name of Parisian marble is given. Among many other things, the finest and most complicated mouldings for ceilings can be made, or capitals of columns can be constructed in any colour. It is said to be hard, durable, and elastic. The *Mechanic's Magazine* speaks of the value of a product formed by mixing bleached gutta-percha with a fine white neutral pigment in powder. On another page we give details of an American patent for bleaching gutta-percha and india-rubber. It is probable that tablets of a substance of this kind might be found more valuable in photography than those in which gelatine rendered insoluble, but which will nevertheless absorb water, have hitherto been found.

Simple Dissolving View Arrangements.—In further illustration of simplifying the method of producing a dissolving effect, I offer the following hint:—Fasten a spring to the tube of the lens, or any convenient part of the apparatus; to this fasten a piece of muslin, gauze, or tracing paper, painted as clouds, which, when the spring is pressed down, will fall over the opening of the lens, and so shut out the light while changing the slide; a hook to hold the spring when down will leave the hands at liberty. A gentleman who stands at the head of the list as a producer of lanterns and slides has suggested the placing a quick-threaded screw midway on the spring, to hold the same down while changing. Those who want a complete and well-finished apparatus should procure from the manufacturer alluded to one of his "Diamond Shutters," an arrangement that opens out the light from the centre of the lens, and then contracts towards it again when required. For large public exhibitions, a strongly clouded gauze, working up and down before the medium, has a very good effect, as it can be so arranged as to open from the centre, [illegible] mere speck gradually expanding to the full circumference of the disc: this I term the Mirrioramic Dissolver.—*A P[illegible] Man.*

The Photographer's Relief Fund.—A correspondent, signing "An Eight Years' Subscriber," writes that, acting on the suggestion of Mr. Bovey, he engages to [illegible] £1 to a Relief Fund as soon as formed, and continue it half-yearly or quarterly as may be required; adding, that if one-fourth of the photographers would do the same, a respectable fund would soon be formed. We shall with pleasure preserve record of such offers, until they become the business of a proper officer.

Mr. Young's Washing Machine.—Two correspondents state that in trying the washing machine recently described in our pages by Mr. Young, they found a difficulty in the water dribbling over the bend of the syphon without filling it, and without, therefore, emptying the vessel. They have both adopted expedients to meet this difficulty. Mr. E. Barraclough suspends the vessel on an axis, weighting it so that it shall tilt and empty itself. Mr. Gillo fixes the vessel to one end of a piece of board with a strip of wood underneath to serve as a fulcrum. On the opposite end a stone is placed, so that the board, resting on the fulcrum, is held down at that end, until the vessel, filling with water, being heavier than the stone, is tilted slightly over, and the water, so filling the syphon, runs off. The vessel then resumes its position, the stone being heavier than the empty vessel; and so the operation is repeated.

Streaks in the Negative.—A correspondent says that he has been troubled with streaks in the negative, which no care or change of nitrate bath removed until he abandoned the use of gelatine in the developer, when the streaks disappeared at once; and gelatine is henceforth to be banished from his operating room.

Submarine Photography.—The photographer will surely not now be satisfied even with exclaiming—

> "Quæ regio in terris, nostri non plena laboris."

He has begun to work in the very depths of the sea. M. Bazin, the first photographer who has operated under water, illuminates the bottom, &c., by means of the electric light, for the purpose of discovering the position of sunken vessels, &c. His photographic studio consists of a strong sheet-iron box, braced transversely, and admitting the light through lens-shaped, water-tight windows; and he can remain in it without inconvenience for about ten minutes. He has produced sharp and well-defined photographs, suited to render the recovery of objects sunk to considerable depths easy, and has already worked at depths approaching to 300.

Poisoning by Cyanide.—A few days ago, an inquest was held on the daughter of a photographer who had committed suicide by taking cyanide of potassium. Deceased was taken to the Royal Free Hospital, where the house-surgeon, Mr. Fagge, tried every remedy to restore the deceased, using the galvanic battery, artificial respiration, and the like, but without effect; and the *post mortem* showed that deceased had taken a very large quantity of the cyanide.

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To Correspondents.

Album.—We are not aware of any albums being made with openings for 7½ by 5 pictures. We have seen albums which contained apertures both for card pictures and larger sizes. In order to secure the manufacture of albums for any especial size, there must first exist a tolerably general demand for the size, otherwise it will be difficult to induce manufacturers to make them.

W. H. Worth.—Of course you saw the matter alluded to in our last. It is somewhat amusing to notice the credence given to statements of this kind in the outside press. Thanks

A Constant Reader.—The lime light is used for enlarging, but not for direct printing, nor is it of much service for taking negatives. You will find several articles in our Fifth Volume on its application to photographic purposes. It is not much used in photography. We have frequently given information on the preparation and use of oxygen, because many of our readers are interested in the magic lantern, for which it is much used.

Hypo.—It is held by some authorities that the coincidence between the chemical focus is often destroyed by varying conditions of light; but we do not think that this is of sufficient practical effect to spoil the definition of your pictures, unless other causes or accidents are present. It is as likely to occur from your own occasional inability to focus. A slightly deranged condition of health will often cause a person to focus inaccurately. 2. Using a forty-grain bath, you will find about an ounce of nitrate of silver consumed by each quire of paper. 3. We have no reason to think that the larger of the two lenses would do the work any quicker. There is no doubt that Mr. Claudet's principle will have occasional useful application. It is not necessary, however, for small pictures. 4. We think that the album portraits will have a run, and albums are now supplied cheap. In [illegible] of photographer we have done our best to press the matter on [illegible] attention.

I[illegible].—You will find a diagram and instructions for using the portrait [illegible] magic lantern in our last Volume, p. 57[illegible], which will doubtless [illegible].

[illegible]r.—It is necessary to register every picture which possesses the [illegible] variation in position or arrangement; but it is not necessary to register smaller copies from the same picture. 2. It is difficult to state which is the most effective washing machine without a number of comparative experiments. We have described two recently, both of which are good. Mr. Grisdale's is perfect as any in principle, as the water is constantly forced through the pores of the paper by centrifugal action.

B. N. D.—The brown or coppery deposit on the shadows of a negative during intensifying is a trouble the origin and remedy of which we have often explained. You will find it fully entered into on p. 43 of our Year-Book for 1864, and in other places. It proceeds from a bath containing organic matter, from insufficient acid, from insufficient washing between operations, and other causes. The most certain remedy is to treat the film with a solution of iodine one grain, iodide of potassium two grains, and water one ounce, between applying the iron and pyro solutions. This almost invariably checks such a deposit. To remove the deposit when once there is more difficult; proceed as follows, however:—Treat the negative with a two-grain solution of bichloride of mercury; this will at once change the brown deposit into a thin, white deposit, which will not interfere with printing, and does not materially affect the other parts of the negative. Wash the negative thoroughly, as soon as the colour is changed.

W. A. Mercer.—We will make enquiry as to the origin of the error, and see to its remedy.

Kent.—The pictures are decidedly improved by the modification in your lighting. We shall have pleasure in proposing you. There is no entrance fee to either society, and the subscription to each is half a guinea yearly. We shall have pleasure in seeing you at next meetings: North London, the first Wednesday in the month; and South London, the second Thursday.

F. P[illegible]chel.—We cannot at present say where you could procure the varnish in question at present. It is not yet in the market. "Newman's Harmonious Colouring Applied to Photographs" is to be had of Mr. Newman, 24, Soho Square, price one shilling. Thanks for your intimation. We shall mention it in the proper quarter.

Charles Waldack.—Thanks. Considering the difficulties, we consider the success very decided. See remarks on another page. It always affords us much pleasure to hear from you.

I. M. P.—We are glad to hear of your success with the use of gelatine. It is not a matter for wonder that every one does not use it, as some have used it and abandoned it. Much depends upon conditions and modes of working. It is invaluable in the hands of some persons, who otherwise have difficulty in obtaining intensity. Others, working under other conditions, find it gives them too much intensity. We object to the use of the term "ferro-gelatine developer," simply because it is a misnomer. It is an iron developer qualified by the gelatine, not a gelatine developer modified by iron. Gelatine is not a developer.

P. Taglis.—We cordially agree with you as to the importance of establishing a Relief Fund as promptly as possible; but we think it would peril the cause altogether to attempt to organize a committee in the informal manner you propose. Such a course would become a source of disputation at once. Whenever the thing is done, the mode must be beyond challenge, and the conduct of it such as will unite the sympathy and co-operation of all classes and parties interested in the art.

J. J. Coghill.—Thanks. We shall write shortly, and will be noticed in our next.

R. J. Fowler.—Thanks. We shall keep the offer in mind.

Lux et Salus.—Received; and shall be duly considered. Thanks.

J. Hammond.—The time must depend on the quality of the collodion and the temperature. Judgment gained by experience alone will enable you to decide. If you had sent us an example we could better have judged of the source of error. Do so when you write again.

W. S.—In answer to your first question, yes. 2. Yes. 3. The single wide-angle will give a more brilliant picture than the triple.

Received: "Hints on Spectacles," by W. Ackland.

Several Correspondents in our next.

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Photographs Registered.

Mr. W. Boyer, Ramsgate,
Photograph of Hunt's Library, Ramsgate.
Mr. H. Hawkin, Bournemouth,
Photograph of Lord S. G. Osborne.
Mr. Alfred F. F[illegible]sk, Woodbridge,
Photograph of Church and Abbey, Woodbridge.
Mr. S. Poole, Teignmouth,
Photograph of M. F. Tupper, Esq.
Mr. H. Waterhouse, Derby,
Photograph of Mr. Rickman, Station Master, Derby
John Von D[illegible], Dorset Terrace, Clapham Road,
A Photograph of a Child pretending to take a Photograph of a Doll.
Messrs. W. and D. Downey, Newcastle,
Two Photographs of Rev. Dr. Manning.
Messrs. Debenham and Son, L[illegible]u, Devon,
Two Photographs of the Editor 'Christian World Magazine'

⁂ All photographs forwarded to the Publisher for registration receive attention at once; but the pressure on our space sometimes compels us to defer the acknowledgment in this column. It should be borne in mind, therefore, that non-acknowledgment at once does not necessarily imply non-receipt or non-registration.

THE PHOTOGRAPHIC NEWS.

VOL. X. No. 431.—*December* 7, 1866.

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THE INTERNATIONAL EXHIBITION OF 1867.

We have received from our esteemed collaborateur, M. Lacan, a communication in which he details the result of an application to head-quarters in Paris for information concerning the position of English intending exhibitors. It is, in brief, to the effect that the English Commissioners were charged with the duty of supplying to exhibitors all information, and affording them every facility, so as to promote a successful issue.

The matter, as regards English photography, is really one between the authorities at South Kensington and the exhibitors. We have already stated the general conditions originally published, in which all trouble and responsibility of transmission, reception in Paris, unpacking, storage of packing-cases, repacking, and re-transmission, rest upon the exhibitor. Lest there should be any mistake on the subject, a notice to exhibitors, just issued, repeats this regulation in No. 6 of the following:—

PARIS UNIVERSAL EXHIBITION OF 1867.

NOTICE TO EXHIBITORS.

1. The Exhibition is to be opened on Monday, the 1st April, 1867, and the Imperial Commission will have a review of the Exhibition complete on Thursday, 28th March.

2. To enable the British Department to open with punctuality, exhibitors are requested to make the following arrangements:—

3. Machinery and Heavy Manufactures.—When foundations are required, the exhibitor must cause them to be commenced before the 5th January, 1867.

4. All heavy machinery and objects of a cumbrous nature must be deposited in the building before the 10th February.

5. Furniture and manufactures of a heavy description must be deposited in the building by the 1st March; jewellery and textile fabrics before the 10th March.

6. Exhibitors are required, either personally or by their agents, to see to the transmission and reception of their goods in the building.

7. Exhibitors must state to the British Executive, on or before the 5th January, if they intend themselves personally being in Paris to receive and instal their goods in the building, or if they intend employing an agent; if the latter, they must transmit by the same date the name and address of the agent who will represent them.

8. A list of the persons who offer their services as agents may be seen at the Paris offices, at South Kensington Museum; but the Executive Commission do not undertake any responsibility whatever in the naming of agents.

9. The British Executive will mark out on the floor of the building the sites of the different allotments made to exhibitors. Those allotments which, by the 15th February, are not taken possession of, will be treated as resigned, and appropriated to the purposes of the Exhibition.

10. The Executive Commission will make the floor, and place the packages in their proper places; but the Imperial Commission require exhibitors to pay all expenses of transmission and installation of their goods in the building, the storage of their packing-cases, &c.

11. All packages must be labelled with the official addresses, which will be supplied by the Executive Commission.

12. Exhibitors are requested to bear in mind the difficulties of transport which are likely to ensue from the blocking of the railways, and to take the earliest opportunities of despatching their goods. They are reminded that without the co-operation of the exhibitors the British Executive are powerless to uphold the national character for punctuality, which they earnestly hope will not suffer in the hands of any of those concerned in the Paris Exhibition of 1867.

13. The offices of the British Executive will be at 71, Avenue des Champs Elysees, Paris, and will be open there on the 7th January, 1867, from 9 till 5 p.m. London offices, South Kensington Museum.

By Order, R. G. WYLDE,
Secretary to the Executive Commission.

However reasonable the condition referred to may be generally, it is quite clear that it is an especially inconvenient one for photographers. The cost of transmission, of engaging an agent to receive, unpack, store, repack, &c., &c., will necessarily—if undertaken by individual exhibitors—be heavy compared with the importance of each contribution, and especially irksome in the anxiety and trouble involved. All this is the less tolerable, seeing that English photographers generally cannot possibly secure any commercial advantage by exhibiting, the chief motive for action at all being a regard for the honour of English photography. The Directors of the Dublin Exhibition managed this well. English exhibitors were instructed to send their picturus to Mr. Green, an agent accustomed to such duties, who packed and transmitted all the contributions, sent them to Dublin, and finally rrturned them to the exhibitors. All this was done without expense to the contributors. The latter part of the arrangement is, we fear, more than can be hoped for now in relation to the Paris Exhibition; but is it not within the power of the English Commissioners to appoint a similar agency, charging exhibitors an equitable sum rated on the space they occupy?

Failing this, are exhibitors prepared to combine and take action for their own protection? We find, from various communications, that many are anxious to do this. Correspondents say, "We will gladly join some one in an agency, so that, by sharing, the expenses may be lightened." To make such combination useful it should be general; but how is it to be effected? There is no existing organization with power to take the matter in hand. It is a business in which the Photographic Society cannot, we believe, even if willing, interfere. It has been suggested to us, that if intending exhibitors would agree to pay in advance a rateable sum (say £1) for each ten superficial feet of space they will fill, all expenses would be covered. Are exhibitors prepared to do this? If so, we think the organization will be tolerably easy. Let all who are willing to do this signify their willingness by communicating with us. We cannot undertake any special duties ourselves in the matter beyond this: if exhibitors generally are prepared to join in this, or any similar plan, we will invite a committee of the chief metropolitan photographers to meet and decide on plans and appoint an agent to take the matter in hand. Although we cannot take any charge of any kind ourselves in the matter, we can afford aid to a committee in undertaking it: but they could not act without the guaranteed co-operation of others concerned. This is one of the unfortunate things which, being everybody's business, is nobody's duty; and we suggest this plan as a means of bringing to a focus the expressed wishes of various persons who could not otherwise come into relation with each other. We could name several agents who would willingly undertake the duties, both Englishmen and Frenchmen, some of whom are, we believe, thoroughly well suited for the duties.

But time presses. There is no room for delay. Photographs will not, we believe, need to be in the building before March, the tenth of that month being the last day for the receipt of any kind of goods; but it will be necessary, if any agent be employed, that his name, &c., should be communicated to the British Executive by the fifth of January next, rather less than a month from this date, and a month in which a week of holiday and festival intervenes. Therefore, unless action be prompt, it will be useless.

We have been speaking chiefly of transmission, reception, &c.; but there is another important subject: we refer to the hanging of the pictures. Nearly a month ago we brought the question before the Photographic Society, and mentioned that the Secretary of the French Society attended the Exhibition of 1862, to superintend the hanging of the works of French photographers. In consequence of those remarks, we received a quasi-official intimation that the English Commissioners would ask the Photographic Society to appoint a person to superintend the hanging of English photographs. Of this we shall probably hear definite particulars at the next meeting of the Society. But there is, in the meantime, an important doubt arises: at whose expense will this be done? We fear not at the expense of the Exhibition authorities; we fear still less at the expense of the Society, who have no funds for such a purpose, and no power to use them for such a purpose if they had the funds. In this case it would be necessary, in some way, to get at the minds of exhibitors as to combining to bear such expenses themselves; and, if necessary, this also could be combined with the general plan we have indicated as regards transmission, &c. At any rate, it is now time for photographers to take action in some way. We have suggested a plan: will they avail themselves of it, or of any other or better, to secure the proper representation of English photography in Paris next year?

MICRO-PHOTO-SCULPTURES.

We have recently received from Mr. Woodbury some exceedingly charming examples of an application of his principle of relievo printing, entirely novel and exceedingly interesting. They consist in what he terms "Micro-Photo-Sculptures," or enlarged images in bas-relief of microscopic objects, the material being plaster of Paris. Nothing can exceed the delicacy, sharpness, and perfect rendering of these reliefs, which give, practically, an enlarged model of the original object. The tongue of a cricket is the most perfect of those before us; the tongue of a fly is also exceedingly good; a flea is from a somewhat imperfect negative, and lacks crispness; but this is in nowise due to the process. The perfection of the modelling depends, of course, on the perfection of the definition in the negative; and the amount of relief, other things being equal, on the intensity of the negative, although this may be considerably modified by management in the manipulation. Those before us are on round tablets about three inches in diameter, the amount of relief resembling the thickness of a skeleton leaf.

The result is exceedingly beautiful, and it is probable that the principle upon which they are produced will find other applications. It is only necessary to remark that it is imperative that the subject to be reproduced should be semi-transparent, and admit of being photographed by transmitted light, so as to secure the relations of form in a relief so produced. An article on the details of the method employed, from the pen of Mr. Woodbury, will appear in our forthcoming Year-Book.

M. CHAMBAY AND PHOTOGRAPHY IN NATURAL COLOURS.

We recently quoted, with some comment, a *canard*, in which the Paris Correspondent of the *Morning Post* attributed to M. Chambay the discovery of a means of producing photographs in natural colours, stating the matter with much circumstance, declaring that he had investigated the process himself, and was satisfied as to the truth of M. Chambay's claims. We suggested at the time that the pictures were probably coloured by one of the many processes in which the colour was applied at the back of the photograph, which was made transparent, the effect being to hide all trace of manipulation or handling, and so deceive the uninformed. It appears that we were right in our conjecture. M. Chambay disclaims all responsibility in connection with the statement, in a letter which we subjoin; and enables us, by his agent, to examine some of his coloured pictures. The method of producing them is not described, but, from an examination, we have no doubt that the colouring is managed in a manner analagous to known methods to which we have referred, a *résumé* of which will be found on another page. The results we have seen are pretty and effective, and resemble those produced by the methods indicated. M. Chambay must be exonerated from participating in or originating the foolish story to which we have referred, and the "Own Correspondent" will in future, we trust, take more care that the inordinate appeals for novelty which his position creates, do not lead him readily into the perpetration of a similar *etourderie*. M. Chambay's letter is as follows:—

"Sir,—An article appeared in your valuable journal (the Photographic News) of November 23rd, in which reference was made to my system of photography, as being mixed up with the old song of "natural colours." It remains with me once more simply and frankly to state that I have never made the least pretension to produce photographs in so-called "natural colours." I claim merely for my system, that the colouring has a natural appearance, different to the ordinary coloured photograph, entirely free from any pencil-marks, with a natural smoothness and relief, resembling the exact image as seen in the camera; and that the colouring is effected in a manner which will ensure stability. The above are my claims, and nothing more. I have once before published a denial of the "natural colour" question, and I do hereby republish it. Allow me, Mr. Editor, to say that I will not, in the future, hold myself responsible for any statements which may be made by persons who choose to write about my style of portraits, and who may again assert that they are the "natural colours" so long sought for,—I suppose, on account of the near resemblance my portraits bear to nature. The great success which I have experienced in Paris has induced me to open an establishment in London also; and I have sent an agent there to watch an opportunity of obtaining a suitable location. I have directed the said agent to place specimens of the process for your inspection, which I hope will, for the future, prevent all false impressions.—I remain, sir, your obedient servant, M. Chambay.

25, *Avenue Montaigne, Paris, December 3rd*, 1866.

A NEW MATERIAL FOR MOUNTING.

BY JOHN SPILLER.

During the past year we have employed in the mounting of photographs an adhesive material of peculiar merit, which, so far as I am aware, has not hitherto been applied to such purposes. The use of thin glue is common enough, and so also is that of gum-water; each has its special advantages, but a mixture of the two proves to be better than either. Equal weights of "imperial glue" and gum arabic are separately immersed in cold water. The first swells up by absorbing its own bulk or more of water, the latter dissolves altogether; the soddened glue is then transferred to a glue-pot, melted by the application of heat, and, when perfectly liquidified, the gum-water is added; the whole is well mixed by stirring, and then strained through fine muslin, to separate the woody particles and other impurities.

In the operation of mounting, this material or compound is warmed in a glue-pot, and applied with a brush to the back of the photograph. A thin, even coating is sufficient, and the print need not be hurried through the rolling-press, since the interval which may elapse before the setting is much longer than with plain glue. Other important advantages are the paler colour and greater solubility of the mixture, so that if, by chance, an excess of the material is applied, that portion which makes its escape around the edges of the print can be instantly removed, by cotton wool slightly moistened, without staining the card margin.

We have had great experience both in the use of gum and glue separately, but their employment in admixture—due to the suggestion of our mounting assistant—is, we venture to think, a decided improvement. The consistence may be modified within somewhat wide limits, and, by altering the relative proportions of the ingredients, almost any desired quality may be secured.

Royal Arsenal, Woolwich, December 1st, 1866.

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ECHOES OF THE MONTH.

BY AN OLD PHOTOGRAPHER.

The Paris Exhibition—Agents—Photographs in Natural Colours (?)—A Method of Colouring—The Meteors—Mr. Bing's Actinometer—The Relief Fund—The Societies.

It is just possible that the patience and temper of photographers will be sorely tried before their contributions to the French Exhibition are hung on the walls prepared for them. It it also apparent that the honour of being an exhibitor will not be unattended by considerable expense. Whether the game will be worth the candle is quite another matter, and there are honours which might be too dearly bought. The difficulty is to get any information, wrapped up as it is in the Gordian-knotted coils of red tape with which the English Commission has been surrounded by the authorities of the South Kensington Museum. Months ago we heard that the English photographic department was placed in the hands of a kind of sub-committee, composed principally of members of a commercial photographic firm. What became of this committee I cannot say; but in June we find that the space had been allotted by the Photographic Society; and the work, it must be confessed, was done impartially and well. That difficult business completed, it appears—from what took place at the last meeting—the authorities have not vouchsafed any further information to the Society. Since the meeting it has, however, been unofficially intimated that the Science and Art Department, to whose management the British portion of the Exhibition is entrusted, will ask the Council of the Photographic Society to nominate some competent person to hang the photographs.

The difficulty and expense of transmitting the specimens threaten to be enormous, and will probably prevent many to whom space has been awarded, and whose names will appear in the catalogue (which is already in type), from being represented on the walls. It is a matter of very little moment to English photographers personally whether they exhibit or not. As an advertisement, in most cases it will be useless; as a commercial speculation, it can scarcely afford much profit to those who endeavour sell their prints; the only reason for exhibiting at all is, that English photography should maintain that foremost place it has always held in the world of art; and as this is more a public matter than a private one, photographers will not care to go to much individual expense. Combination, therefore, as recommended in a leader in the News of November 23rd, will be the only plan possible, and no time should be lost in maturing a satisfactory scheme.

In connection with this subject, and to give some idea of what would be the cost of employing a private agent, it is worth while calling attention to the circulars photographers are receiving daily from these gentlemen. Some of them state their prices, others do not. The terms of the most moderate are, to commence with, a kind of retaining fee to be paid down at once, the amount to be decided by the quantity of pictures sent, but the minimum of which is £20. For this, the happy exhibitor would have his frames dusted occasionally; the assistant he sent over to unpack would be overlooked; he would be allowed to write a letter in the office of the agent. All other services will be charged under the head of extra expenses. I have already said some honours might cost too much. Am I right?

The gentleman who does duty in Paris as "Own Correspondent" to the *Morning Post* has created quite a sensation amongst those of his readers who know nothing of photography, and, therefore, are not in a position to see how far his remarkable statement was true or false. He has deliberately said, without any qualification or "hedging" whatever, that he has seen photographs taken in colours in the camera, and these so perfect that nothing has ever approached them for exquisitely varied tints of flesh and transparency in the shades. He goes still further—we must not suppose that it is a take-in this time—he has carefully investigated the process, and is able to declare that the long-desired and long-prophesied triumph of chemistry is at last accomplished, and is, as he calls it, the great chemical and art event of the day. Never did the human hand reflect flesh and texture of drapery with such wonderful exactitude. Notwithstanding these very decided statements, photographers, of course, were very sceptical, especially as, by a singular coincidence, M. Chambay, the producer of these pictures, has previously had the same great invention attributed to him by another newspaper correspondent, when, however, he had the good taste to repudiate the honour. I have just learned that an agent of M. Chambay's is now in London, who states that the pictures have never been exhibited as taken direct from nature, and that he is also at a loss to know how the mistake could have arisen. So am I. Correspondents to daily papers, or, indeed, to any papers, should be the least gullible of mankind, as their position renders them peculiarly open to misinformation. If this gentleman had said that, in his opinion, these pictures looked like photographs in natural colours, the whole matter would have rested upon the value of his opinion; but it is too bad to state that he has satisfied himself of the fact by "investigation." We in England have long been very sceptical of these American and Continental discoveries of photographs in natural colours. In America, some years ago, a Mr. Hill kept the newspapers supplied for some time with paragraphs about his astonishing discoveries in this branch of the art; but he never showed his process. I understand, however, that English photographers will shortly see M. Chambay's pictures, when it will be interesting to ascertain whether they are a decided novelty, or simply a revival of some of those old methods of colouring behind the print. There are two or three processes of colouring which represent exactly what I should imagine a photograph taken direct in natural colours to be like. There is one amongst several methods which has, I believe, been patented more than once, but that is of no consequence; the aim of the patentees appearing to have been to hang up the seal of the Patent Office in their show-room, rather than proceeding against infringers of their supposed rights; it is also the secret process which some colourists advertise under magnificent and high-sounding Greek names

The results, when well managed, are very pretty, and I wonder it is not more practised. It consists in colouring an unmounted print, stretched on a frame, in water colours, a little more vividly than would be usually thought necessary: then saturating the print with wax, and when made thus semi-transparent, backing with a piece of white or cream-coloured paper. Other plans consist in colouring a print at the back, and then making it semi-transparent with wax or varnish. Others, in putting a semi-transparent plain print upon a very vividly-coloured print, the crude colours appearing soft and delicate through the waxed print which covers them, something in the fashion which has recently been patented in connection with the photo-relief process, and to which I make reference in another paragraph. There is, again, the method of colouring "alabastrine" pictures, and coating them with a "penetrating varnish" which projects the colour into the film, so that they show through on the other side. All the methods mentioned give a print which, although coloured, shows no trace of manipulation or "handling," and enable artistic quacks to get *canards* into circulation about photography in natural colours.

Many photographers, after listening to Mr. Claudet's paper on Tuesday, the 13th of last month, went home and attempted a much more difficult task than Mr. Claudet had set them. That gentleman advocated the production of photographs while the lens was moving. Many of his hearers on that night attempted to catch a recollection on their plates of moving sitters ("sitters" is not an appropriate term) not moving with the "dither" of nervousness, not either moving at the very moderate pace of a mail train, but going ahead at the rate of thirty miles in a second. There are bounds even to the powers of photography; and I do not hear that anybody succeeded in securing the image of any of the thousands of meteors that formed such a splendid display of celestial fireworks on that night. Comets, meteors, &c., more or less accommodated with tails, appeared on the sensitive plates; but, I believe, were more attributable to dust than to the runaway young stars that were having such a game overhead.

The actinometer of Mr. Bing, which for want of time could not be shown and explained at the last meeting of the Society, is one of the most ingenious things of the kind I have seen. Extremely simple and easily understood, it is managed with very little trouble, and is capable of application to many purposes. I should like to see this instrument employed and carefully noted in various parts of England and Scotland; we should then get some interesting and useful statistics of light.

Photographers appear to be taking increased interest in the contemplated Relief Fund, but no one has yet come forward to take the lead. I believe that I am quite right in stating that there is every probability this matter will be energetically taken up immediately after Christmas. In the meantime, suggestions as to its formation and management would be useful.

The meeting of the Photographic Society was one of the most animated we have had for years. Mr. Claudet read his famous paper on the moving focus, which has been so much discussed that I need not enter into the subject here. It will be sufficient to say that Mr. Mayall, Mr. Jabez Hughes, and other speakers, condemned the method utterly. Some of the specimens exhibited as the results of the process unfortunately said more even than the very energetic speakers against its adoption. The inferior quality of a few of the specimens was, probably, partly owing to the light in which they were taken, and partly to that weak point in the method, the shaking of the camera. Mr. Claudet would have acted wisely to bring those of his specimens only which were really very fine, and spoke well for his method, leaving at home the under-exposed pictures taken in bad light.

The North London meeting was dull. A long, well-meant, but very desultory and unphotographic paper was read, which did not tend towards the enlivenment or the enlightenment of the members. Accounts of photographic trips must be very well written, or contain a great deal of practical information, if they are expected to be interesting; and, under any circumstances, are scarcely matters for discussion at meetings.

The meeting of the South London was better, perhaps because there was no paper read, although two had been promised. The meetings of this Society are always worth attending, for the lively conversational character they assume when nothing better is before them.

The Provincial Societies have been chiefly occupied with annual reports and the election of officers for the coming session. At the Liverpool Amateur Association a paper was read on Ashton's Patent Chromo-Relievo Pictures. These pictures consist of impressions by Woodbury's process, printed on a chromo-lithographed surface. I have always understood that this was one of Mr. Woodbury's suggestions, and am at a loss to understand how a patent of such a process can be maintained.

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HINTS FOR OPERATORS.*

Care should always be taken to keep the vessels containing the different solutions perfectly stoppered, to prevent evaporation and to exclude dust: the bath should never be uncovered, except for the purpose of sensitizing the bath.

The hands should be washed in clean water after the development of every negative, to avoid the risk of staining the next plate, and, perhaps, spoiling the bath.

The dark frame should be well dried and cleaned after a plate has been exposed, in order to prevent the formation of any spots on the corners of subsequent negatives.

The vessels containing the developing solutions and the silver baths should be frequently cleansed.

The use of soap must be carefully avoided for washing the hands, and the towels used for drying should be employed for no other purpose, and kept quite free from any substance which might attach itself to the hands, and thus affect the negative or the silver bath.

Any dried particles of collodion which may have been formed on the neck of the collodion-pourers must be carefully removed.

The greatest cleanliness is indispensable whilst manipulating with the different chemicals, and every bottle should be carefully labelled, so as to preclude the possibility of any confusion or mistake in the laboratory.

Every evening a sufficient quantity of collodion for the morrow's use should be poured off into small bottles or collodion-pourers, so that it may remain undisturbed for some time before required for actual use; if the collodion is too thick, a little alcohol and ether is mixed with it previously to its being decanted. Any disturbance of the collodion or varnish should be avoided as much as possible, as when once disturbed the collodion requires a long time to settle, and any suspended matter or air-bubbles in it invariably produce either opaque or transparent spots on the negative.

The silver baths, the developing solutions, and the collodion should always be maintained at a moderate and even temperature.

The glass plates should be carefully dried in winter, and kept well aired in summer.

The emanation of any sulphurous or ammoniacal vapours in the vicinity of the silver bath, or in that part of the laboratory where the development of the negative takes place, should be carefully avoided.

Negatives must be thoroughly washed after having been submitted to the action of the different solutions, and more especially after fixing with hyposulphite of soda; the crystallization of this salt infallibly destroys any picture from which it has not been entirely removed.

By filtering the different solutions, both before and after their employment, greater success in manipulating may be ensured.

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* *Le Moniteur de la Photographie.*

Blue litmus paper should be carefully preserved in a box impervious to light and to the atmosphere, to prevent its being reddened by the action of the carbonic acid in the air; should it become at all coloured, it may be brought back to its original bluish tint by moistening it in water containing a slight trace of caustic potash (one drop of caustic potash in 120 grammes of water). The rough litmus paper is more sensitive than that which has been glazed.

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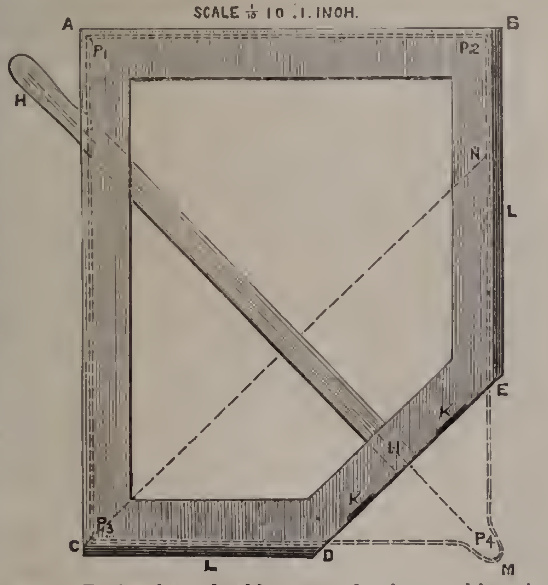
EMPTYING LARGE DISHES.

A correspondent, to whom our readers are indebted for many useful suggestions, sends us the following diagrams and description of a very simple and efficient method of effecting a very troublesome operation, namely, the emptying of a large flat dish without spilling any of its contents:—

Sir,—If there be an amateur among your readers who has inflicted on himself a large-size pan for sensitizing at one operation an entire sheet of paper, he will have encountered the trouble and risk of emptying it, and he alone will fully appreciate the usefulness of the stand for such a pan, of which I now send you a plan.

As the lift is in the direction of the outflow, the smallest amount of care, in not pouring off too hastily, will enable him to do so without the loss of a drop of his solution; and, by subsequently leaving the pan inclined for a short time, even that portion which at first adheres to the bottom and sides will drain down to the lip end, and can be poured off. By means of this stand the pan can be easily cleaned; and, by having a cover made, the solution may be left in it, and be kept free from dust.

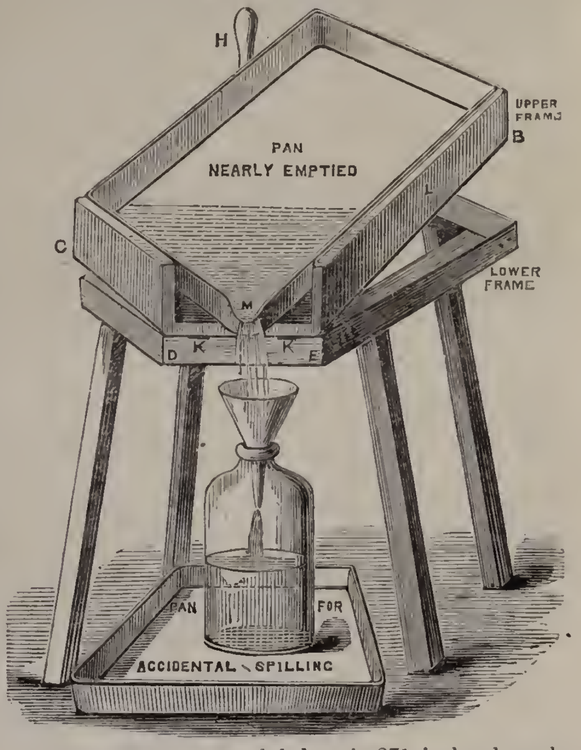
I have not troubled you with dimensions, for as the whole object of the stand is merely to obtain a steady lift in the natural line of outflow, any carpenter can devise his own mode of doing so. I send you the plan of one which I have found to answer, but others may suggest a much better arrangement. We only talk of photography here, but there are many other uses to which the principle of this stand may be applied.



A B C D E, a framed table or tray for the pan, hinged on the side D E, to a framed stand corresponding in size with the upper frame. H H, handle, connected with the frame and set at right angles with the side D E. L L, ledges fixed on the side of the frame, to prevent the pan from sliding forward when lifted. P1, P2, P3, P4 (double dotted lines), the pan lying on the frame. The handle, H, is to bisect the line P3, N, which line is the base of the triangle, P3, P4, N. The hinges, K K, are set at right angles to H H.

If the stand is to be a movable one, the legs must be so placed as to resist the thrust or pressure on D E when the pan is lifted, and also so far apart as to allow a large vessel to be placed under M, even when so depressed as to be nearly perpendicular, and in the line D E. There is a strip of wood between the two frames, which, fastened to the lower frame by an iron "eye," can be lifted into notches cut below in H, so as to keep the frame and pan at any required inclination. Small blocks of wood, about an inch square, placed on the upper frame, and on which the pan shall rest, will throw the spout or lip farther out from the lower frame, and allow a larger funnel to be used.

Plan for Emptying the Largest Pans.



The cover of the pan and ledges is 27½ inches long by 22 wide and 23½ deep. N.

November 12th, 1866.

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PHOTOGRAPHY AND THE MAGIC LANTERN.

BY T. S REEVES.

Perhaps at this season of the year it may not be amiss to say a little more on the magic lantern I described last winter (I believe at page 575 of last Volume).

Although the paraffine lamp I then recommended was much superior to the usual oil lamp supplied with these instruments, I now use the oxycalcium light generally, not only because the light is nearly five times greater, but because of—what is far more important—the great increase in sharpness and depth of focus, which is noticed by every-one, and remarked. No doubt it is chiefly owing to the source of light approaching nearer to a point. The light from the right side of a large flame cannot give the picture on the same identical part of the screen as the light from the left side of the flame does, when, perhaps, they are removed 1½ inches from each other.

To make the alteration to the lantern is very easy. Procure a Black's blowpipe, which costs one shilling, and is conical. Make a hole in the side of the lantern (behind the condenser) at a height from the bottom one inch less than the height of the centre of the condenser from the bottom, and of a size such that the conical stem of the blowpipe fills tight, and has its nozzle-point opposite the centre of the condenser, but pointing away from it. A good size spirit lamp, with a wick trimmed flat, is placed underneath the nozzle, so as to just touch it with its centre. A lime ball or lump, about the size of a marble, with a hole through it, or partly so, must be supported on a wire so as to touch the flame of the lamp when that is lit. This wire must be fixed in the piece of board the lamp stands on, and behind it, so as to be out of the way of the latter. At the proper height this wire is bent horizontally, so as to be brought over to the flame; it is then turned up perpendicularly for half an inch; it is on this the lime ball is put. These balls are easily made by chopping a lump with the kitchen knife into a roundish form, and making a hole with a brad-awl, gently pressing. The centre of the lime ball will be exactly opposite the centre of the condenser, and of a distance from it equal to the flame of the ordinary lamp when that was used. Of course, the blowpipe nozzle is inclined upwards, because it was inserted in the side of the lantern an inch below the centre of the condenser.

If the india-rubber tube of the gas-bag is now pushed on the end of the conical blowpipe, all will be in position. I should advise a cubical gas-bag, as it takes up much less room; one only 15½ inches square will hold upwards of two feet of gas, and give a light upwards of an hour. It should be put in a light box, the tap coming out of a hole in the side. A stout board is then placed on the bag, and fits loosely in the box. On this board the weights are placed (20 or 30 ounces). When the tap is turned a most beautiful light is emitted, without smoke or smell; the picture comes gradually into view, until it arrives at its maximum; and if turned gradually off, the dissolving effect is done to perfection. The cost of a bag 15½ inches cube is 26s. at Budgen's, 79, Goswell Road, London; 17·5 cube will hold three feet of gas, and cost 29s. This will last, with economy, nearly two hours. The box containing the bag can have a top put to it, over all, and eastors, in which form it makes an ottoman. The usual wedge-shape bags take up double the room with their heavy boards and very unsightly appearance.

The other night I used the oxyhydrogen lime light for my lantern, which is many times stronger than even the oxycalcium, and obtained, in all probability, the most brilliant lantern image that ever was seen. A newspaper could be read in any part of the room, and the pictures look like daylight views. My lens had an aperture of 3½ inches clear, and only 9 inches focus. I send you, sir, a picture taken with the lime light only, in one minute, long after dark. It is not so active as the magnesium wire, but is more convenient, and cheaper; and, as an auxiliary to daylight, very useful. Owing to the smoke that comes from the wire, not more than two pictures can be taken; while the lime light gives off no smoke or smell, and never goes out. It costs about 9d. per hour, half a pound of chlorate of potassa yielding more than two feet of oxygen, and costing 1s. 6d. per lb. (1s. 1½d. by the cwt). I use coal gas instead of hydrogen, and find it nearly as good. The bag for this should not be less than three feet capacity. A convenient size is the following:—Oxygen bag, 17½ inches square, and 12 inches high; hydrogen bag, 17½ inches cube. They are both to be placed in the same box, one on the other, the taps coming through a slit in the sides; a fifty-pound weight placed on the stout board before alluded to, the same weights (best of lead) acting for both bags, which is very convenient. The box, with its top on, looks like a pillar, and serves for a support for the blowpipe; the whole arrangement forming a striking contrast to the usual large wedge-shape bags, double massive boards, trailing tubes, and double set of weights. I always draw the curtain back over the head, so as to have nearly perpendicular light, which is far the most active in dull weather; and I reduce the shadows by means of artificial illumination. The effect is excellent; and pictures can be taken all day, when without its assistance it would be impossible. I know my letter is long, but the importance of artificial light, cheap, and easy of application to the photographer, must be my apology.

Plymouth, December 4th, 1866.

P.S.—The portrait I enclose was taken with a condenser, and not with the naked lime light.

ON FOCUSSING SURFACES.

BY M. CAREY LEA.*

To the remarks which on a former occasion made upon this subject, I propose at present to add the results of some further experience, and to suggest a new, easy, and efficient method of obtaining an excellent focussing surface.

Bad photographs are as often defective from bad focussing as from any other cause. When a good lens is perfectly focussed, and the resulting negative is printed upon highly albumenized paper, pressed firmly against it, there results a picture with a brilliant clearness of outline, which no engraving, no artist's sketch, can in the least rival. The effect is extremely beautiful. It by no means interferes with softness. It would be as reasonable to say that a landscape could have no softness with a clear atmosphere, and that the best time to view natural scenery was in foggy weather; such a position would not be one whit more absurd than condemning sharp photographic work as necessarily hard, or even tending to be so. Some of Mr. Wilson's stereograms offer the best refutation which such an opinion could be met with.

Doubtless, much imperfect focussing depends upon the defective surface upon which the picture is often focussed. I have yet to see a good piece of ground-glass made in this country,† and I have known photographers to remove the ground-glass from their camera, and laboriously work it over themselves, in the hope of getting it into such a condition as would enable them to see some of the fine detail upon it. Such care is exceedingly well bestowed. But all have not the necessary familiarity with the mechanical operations of polishing, grinding, and smoothing. Besides, it is annoying to have to devote so much time and trouble to preparing a plate which may at any time be broken.

In a previous article devoted to this subject, I proposed several new methods of producing a surface upon glass, with a grain so exceedingly fine, as made it capable of receiving very exact detail. One of these methods consisted in applying a layer of *starch* upon the plate, which in drying leaves a thin opalescent pellicle. The other consisted in precipitating sulphate of baryta in a solution of gelatine, by which means the baryta salt was kept completely suspended in the liquid. A plate of glass was then coated with this opalescent gelatine, and allowed to dry.

Both of these methods gave excellent results, and when I published them, I thought them all that was needed; especially as the starch process was evidently within reach of everyone, and gave most beautiful films.

Subsequently, however, a very serious and unexpected objection presented itself to both these methods. With time, the films showed a strong tendency to flake off, and leave the plate in spots. These spots continually widened, until, in one plate which I had constantly in use, the whole of one end of the film split off from the glass. Nor was it possible to retain them on the plate by varnish, for the grain of these films was so very fine that the application of a varnish rendered them almost perfectly invisible. The varnish made them as transparent, or nearly so, as the plain glass.

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* *Philadelphia Photographer.*

† Since the above was written, Mr. B. H Shoemaker, of this city, has had some glass very beautifully ground for me.

To avoid these difficulties, one way only has suggested itself—to prepare a varnish which should itself have the necessary opalescence. That I have succeeded in doing, and thereby in preparing focussing plates even better than those prepared by the means before detailed, and, at the same time, free from all tendency to peel off. The substance which I employ for this purpose is *tartaric acid*.

I take a good negative varnish made with alcohol, and saturate it thoroughly with tartaric acid. It does not dissolve a great deal, and to get a sufficient quantity into solution, the acid must be finely pulverized, added in considerable excess, and the phial well shaken at intervals for several days. It may then be allowed to settle for a day or two, when the clear liquid is to be poured off.

It is to be applied precisely in the same way as in varnishing a negative, that is, the plate is to be gently warmed before and after the application of the varnish.

I cannot, of course, affirm that all negative varnishes will answer equally well for this purpose, even if made with alcohol, though there seems no reason to the contrary. That which I used was an old varnish made after Hardwich's receipt of lac, sandrac, and alcohol.

The grain of the film obtained in this way is so fine, that the smallest print may be read through it with ease, even when the other side of the glass is placed next to it. At the same time, it is not too transparent. It thus reconciles the two points to combine, which is the grand difficulty in making a focussing film; for there is no difficulty in obtaining a film of fine grain in many ways, but this quality is accompanied with a transparency which renders the image on the ground-glass too dark and indistinct. When it is attempted to focus on such a film, only the strong contrasts of the picture can be seen—a dead branch standing out against a sky, or something similar; but the film which I describe renders every part of the picture plain and distinct, and the finest details can be watched, as the camera draws out and in, to find the focus.

I think it may perhaps give a better idea of the quality of such a film as this, if I describe what it is capable of accomplishing in the way of clearness.

I placed a book before the camera, of clear but not unusually large type, and at such a distance that the image on the focussing plate was diminished to *one-hundredth* of superficial size as compared with the original. On this image, with the aid of a single lens of moderate power, the loops of the letter *o*, wherever it occurred, could be made out. Now this could not be done on ground glass—at least, not on any that I have seen—even with a much more powerful lens; for if the grain of the film is not sufficiently fine to receive and show the fine detail, no magnifying can bring it out. A comparison which I made between this plan and a glass plate which I had roughened with hydrofluoric acid gas, was three to one in favour of the former in point of visible detail.

I cannot close this article without again calling attention to the necessity of focussing upon glass of the same description as that on which the negative is taken. A very large number of negatives, especially in portraiture, are taken upon blown glass; and focussing is almost universally done upon ground glass, which is more or less brought to a true plane surface in the operation of grinding, even if it had not before Thus the surface on which the image is focussed, and that on which it is fixed, do not correspond in position. I recommend to have the focussing slide furnished with a rebate and springs, so as to admit of easy changing the focussing plate. If the negatives are to be taken on blown glass, let one of average curvature be selected, or of rather less than average curvature, and prepared as above described. But if the photographer is resolved to retain the old fixed focussing slide, and focus upon a plane surface, while he takes his negative upon a curved one, let him at least be sure that his focussing slide and dark slide are so regulated as to repair this evil. When he measures his focussing slide and dark slide together, let him put the plane glass in the former, and the average piece of curved glass, corresponding to that which he habitually uses, into his dark slide. Then closing the back, the pressure of the spring will slightly flatten the curved glass, and bring it into the same condition as will be the negative plate in actual work. Next, lay an iron or thick glass ruler across the frame, rest one end of a stiff card upon the middle of the glass, and with a pencil, with a long sharp point, draw a line upon the card, where the edge of the ruler touches it, pressing the card close up to the ruler. Repeat this with the dark slide, and if the frame is properly regulated, the two thin sharp pencil lines will be exactly coincident, and form but one. There ought not even be a sensible increase in breadth of the line when the second is drawn. The pencil must be hard; cut fine enough to draw a line like fine steel engraving. I have satisfied myself by actual measurement, that it is easy with a 6H Faber's pencil, properly cut, to rule lines 1-320th of an inch in thickness. This is accomplished with the greatest ease, and lines of not more than half that breadth might be made if it were an object. This mode of measuring, therefore, unquestionably affords fully as much accuracy as the camera-maker can work up to.

It is in many respects far better to make the measurement by transferring the same piece of glass from the focussing slide to the printing slide. Then, if the adjustment is found, or made to be, correct, we are certain that the two frames will work together correctly, and we have only to be sure that the glass we focus on corresponds precisely in curvature, or, in absence of it, with that on which we take our negative. But if it is intended to focus on ground glass, and take negatives on curved glass, it is self-evident that the slides should be arranged so as to compensate for the difference.

As an example of what may be accomplished with entire ease, by attending to these simple precautions, I may mention the following:—A page of a book was taken, on which was the commencement of a chapter. On the blank space above the head of the chapter there were faint marks of the print on the other side showing through, although the thickness of the paper was not sufficient to have attracted my attention. The negative was reduced to one-fiftieth the superficial area of the original, and with the aid of a glass the words on the under or reverse side of the paper could be distinctly made out upon the collodion film.

IMITATION IVORY MINIATURES, PHOTO-CHROMOGRAPHS, ETC.[*]

A METHOD of colouring photographs intended to be set as brooches, or in lockets, in imitation of ivory miniatures, has recently excited great admiration, and has been extensively employed by a few photographers, but, having been kept as a secret by those who have attained a knowledge of the method, it is not known to the general body of photographic colourists. The effect produced is so exactly like that obtained on ivory that it is only by those who have had great experience in coloured miniatures that the difference can be detected.

The method of proceeding is as follows:—The photograph to be coloured, which must be on plain salted paper, must be printed rather larger than that part of it which is required to be finished, in order that a margin might be left to paste on the frame which is about to be described. An aperture is cut in a piece of thin wood or mill-board larger than the part of the photograph to be coloured; the print is now damped, and the edges pasted on to the frame. When dry, the paper will be found to be stretched tight, exhibiting a smooth surface to work upon, and the back of the part required will be clear of the frame. The picture should now be painted in water colours, as described in a former part of this work, with the exception that the colours must be more forcible, and the face of the portrait darker than will be necessary in the finished result; the after operation making the picture paler than before the wax is applied.

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[*] "Harmonious Colouring Applied to Photographs." Newman.

When the picture is quite finished—and it is as well to avoid any after alteration or corrections—melt a little pure white wax in a porcelain capsule, and, holding the picture before a fire, apply the wax to the back with a brush. The picture will appear to darken all over, but will regain its colour on cooling. It should now be cut out of the frame and backed with a piece of warm tinted or cream-coloured paper. If any alterations are absolutely necessary, they may be made by mixing a little soap with the colours employed.

Another method on the same principle, but requiring less artistic skill, consists in colouring very forcibly and rudely one print which is mounted on cardboard. Another print from the same negative, printed somewhat lightly on thin, fine paper, and not toned too black, is made transparent either with wax or varnish made with Canada balsam and turpentine. This is stretched tight upon the face of a good piece of colourless glass, to which it is attached throughout with the varnish. It is then fitted so as to superpose accurately upon the roughly-painted copy; the transparent print has the effect of softening and blending all the harsh colouring in the original, and giving a good effect with very little expenditure of skill or time. Care must be taken, however, that whilst the glass and transparent print superpose accurately, they must not be quite in contact with the roughly-coloured print; a strip of card must be pasted at the edges of the latter, the thickness of which strip divides the transparent print from the coloured one, and gives a great appearance of relief and softness.

Another method on the same principle consists in first making the print transparent with wax or varnish, and then colouring at the back in oil colours forcibly but roughly. The print is then mounted and varnished with mastic varnish, and has the effect of a picture coloured in oil.

Another method on the same principle yields, with skill and care, very pretty results resembling enamel. A print on glass by the Simpsontype, or collodio-chloride of silver, process is produced, and, when dry, is coated with a solution of gelatine with which a little Chinese white from a tube has been mixed. When this is dry, the picture is coloured at the back, on this gelatine surface, with either water colours or powder colours. If with the former, the gelatine surface should be first coated with collodion, to prevent it working up; if with powder, the instructions in the chapter on "Non-inverted Coloured Positives" should be followed. A little practice will be necessary to ascertain the depth and tint to be applied, as the result can only be guessed at in course of colouring. When done, a piece of gelatinized paper is pressed into perfect contact with the picture, avoiding air-bubbles; this is left to dry, and then the whole is removed from the glass by running a penknife round the edge, and a brilliantly-coloured miniature, with an enamel-like surface, is obtained. The glass may be prepared with an almost imperceptible coating of wax dissolved in ether, before it is coated with collodio-chloride, in order to facilitate the whole readily leaving the glass when finished

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GORDON'S MODIFIED FOTHERGILL PROCESS.

BY PROF. TOWLER.[*]

It was my intention to make some investigations in the science of photography, and to communicate the result of those investigations to your learned body; but excess of necessary occupations has prevented me from doing so, and I am consequently reduced to the condition of giving you my experience with known processes. My aim is always to promote, as far as possible, the interests of practical photographers; and, as the best dry process has not yet been selected, or, if selected, has not yet been acknowledged in this country, my attention has been called to Gordon's Modified Fothergill Process. At the outset I may remark to you, that this process, in my hands, turns out to be the most satisfactory of any dry process that I have tried. During the extreme heat of summer I failed to obtain that success which I anticipated; but the difficulty seems now to be understood, and the proper remedy has been suggested by Keene and other English photographers of celebrity.

The plates are thoroughly cleaned by any of the ordinary methods; if they are intended for the changing-box, I previously break off the four corners and grind them round, and abrade all the edges, but especially those of the two ends, in order to remove all obstacles to the sliding of the plate from the changing-box into the plate-holder, and then back again.

No substratum of any kind is required.

Collodion.

Any ordinary bromo-iodized collodion, which will answer for the wet process, will yield, I imagine, good results in this dry process. I lately mixed together all my old residual collodions; some were simply iodized, others bromo-iodized, and one was chloro-iodized; each one had given good results in its day: these then were mixed, thinned with alcohol and ether; and this mixture I have used during the summer, both for wet and dry plates.

Each plate is coated with this collodion, and sensitized in the ordinary bath of nitrate of silver, containing about thirty-six grains to the ounce, and made slightly acid with a solution of nitric acid and gelatine. I have supposed that there is an advantage in this gelatine solution, but am not prepared to prove this to be a fact. Near the bath I have two wash-basins, each full of rain-water; and as soon as the collodion is properly sensitized, the plate is transferred from the bath, and placed in the first wash-basin, the film being downwards. The four corners resting on the concave surface of the vessel below prevent any damage to the collodion film; and this position allows the excess of nitrate of silver to sink. As soon as a second plate is sensitized, the back of the first plate is well washed with the fingers, and the plate, being well oscillated in the water, is transferred to the second wash-basin; the second plate is now placed in the first vessel.

A third plate is next coated with collodion, and placed in the silver solution.

The first plate is again well oscillated in the second wash-basin; and a quantity of clean water is then poured over its surfaces. By this process all free nitrate of silver will have been removed.

The next operation consists in coating the collodion film with the prepared albumen.

Stock Solution of Albumen.

White of egg	10 ounces
Water	5 ,,
Ammonia	1 drachm

Mix these ingredients in a bottle, shake the mixture intimately together, and set aside for use. The bottle is kept carefully corked.

I have also in stock solutions the following:—

Nitrate of Silver Solution.

Nitrate of silver	2 drachms
Water	4 ounces.

Citric Acid Solution.

Citric acid	4 drachms
Water . . -	6 ounces

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[*] Read before the American Photographic Society, October 8.

Ammonia.

Concentrated ammonia	... ...	2 ounces.

With these stock solutions I then proceed as follows:—

To two drachms of the prepared albumen add the following mixture:—

Nitrate of silver solution	... ...	7 minims
Ammonia	... ...	2 „

Shake the two solutions together until the precipitated oxide is redissolved, then add the mixture to the two drachms of albumen, and shake again. This emulsion is poured upon the moist collodion film, and made to flow backwards and forwards upon its surface for about a minute, and then allowed to drain off. The plate is now thoroughly washed in the following manner:—

I cut the bottom off from a pint bottle, and fix a tube of glass, drawn out to a fine aperture, in the cork. This vessel is nearly filled with rain-water, which, issuing in a fine jet, is made to play upon the albumenized collodion film. The object of this is to remove an innumerable quantity of minute asperities and vesicles in the albumen coating. This object is speedily effected by allowing the jet of water to fall from a height of eighteen inches, obliquely, upon the film. As soon as the surface of the collodion film is perfectly smooth, the plate is swilled with a few ounces of rain-water on both sides, and then put away to dry. When dry, the film is smooth and hard, and not liable to be damaged by ordinary handling.

Development.

I expose with the globe lens, stereoscopic size, and the smallest aperture, for three minutes, when the sun is behind a cloud, during the middle of the day; that is, from nine to three o'clock. This is the average length of exposure under the conditions.

The development requires extreme patience; but success is certain with this patience.

Moisten the film first with rain-water, then place the plate, collodion side upwards, at the bottom of a flat porcelain or glass dish, and pour upon its surface a sufficient quantity of the following plain pyrogallic acid solution, so as to cover the film:—

Pyrogallic acid	... ...	12 grains
Water	... ...	6 ounces.

In a minute or two the picture will appear, but it will be quite faint, and will remain so with this solution. As soon as it is all out, add to the solution of pyrogallic acid, if still colourless, four minims or more of the citric acid solution, and shake well. If the picture come out quickly with the plain pyrogallic acid solution, add more of the citric acid. Now add two minims of the thirty-grain solution of nitrate of silver solution, and pour the mixture again upon the picture, which will now gradually become more and more intense. Add gradually one drop of the silver solution to the pyrogallic acid as it is needed, but do not hurry the development, which is most successful when it is slow. If the development become coloured, throw it away and prepare a fresh solution.

When the shades are intense enough, fix with either hyposulphite of soda, or with cyanide of potassium. With the former fixing solution the colour of the finished negative is olive, brown, or grey; with the cyanide it is reddish. Both these colours are non-actinic, and consequently it is not necessary to intensify to the same extent as in the wet process. I prefer fixing with the cyanide.

Negatives prepared by this process exhibit no pinholes; the surface is uniformly smooth and free from flaws; besides this, the film never slides off from the plate; at least, it has not yet done so: this is a bully process.

As I said at the beginning, there is nothing original in this communication; but it is a corroboration of Gordon's own practice, and on this account it has its value.

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PHOTOGRAPHY AS FINE ART.*

Out of the domain of portraiture, the art claims of photography have been less disputed. Bedford's photographs of the ruins of Baalbec, of the Mount of Olives, the Garden of Gethsemane, or the Lake of Gennesareth, and a hundred other scenes in the East, are subjects in which we require the most literal imitative art, and of which we should resent the production of fancy pictures, or even renderings in which the subjectivity of the painter obtruded itself. In the Swiss views of Mr. W. England, and the English lakes of Mr. Mudd, we prize the admirable rendering of charming scenes in nature the more because they are also truthful. The wondrously beautiful instantaneous pictures of Mr. Valentine Blanchard or Mr. Breese, in which the varying phases of flying cloud and breaking wave, of sunrise and sunset, transient glories which the jaws of darkness swallow before a man can say "Behold!" are prized because they snatch a grace beyond the reach of art. In all cases where pure imitative art without imagination is required, it is scarcely questioned that the sun is the best limner, "nature's sternest painter, yet the best."

The photographer's materials are doubtless less plastic than those of the painter, and less capable of expressing the artist's conception. Yet even in this respect photography is not so mechanical as might seem at first glance necessary to such a mode of delineation. The photographer can stamp the impress of his mind upon his work, and in proportion to his artistic culture will be the beauty of his work. Even in portraiture, the "manner" of the photographer is as distinctly seen as in the work of the painter, and the connoisseur in this branch of art, in looking over a series of portraits, will distinguish with perfect certainty a Claudet, a Williams, a Mayall, a Robinson, or a Silvy. It is not merely in the distinctive arrangement and accessory, in the management of pose and lighting, or in the attention to expression which is apparent; but in the pictorial feeling of the whole that this manner is manifest. The control over the light and shade, and the force on the one hand, or the delicacy on the other, depending much on the judgment exercised in the exposure and in the chemical process of development, all exercise an important influence on the art-value of the result, and effectually preclude the notion that in photography pictures are produced by a mechanical process similar to that in which a tune is ground out of a barrel-organ. Without falsifying, photography can ameliorate if it be in the hands of an artist, whilst it may easily caricature when it is in the hands of one ignorant of art. The latter, like Procrustes, fits every sitter to his limited appliances, regardless of the result.

It cannot be denied that photography has many pictorial offences to answer for; and if its art-claims were to be judged by the productions of eight-tenths of the self-styled "photographic artists" who multiply travesties of humanity, they would assuredly be found wanting. Every form of awkwardness in position, every style of incongruity in accessory and entourage, has been exhausted, every canon of art studiously outraged. Even the special claim of photography to accuracy has been ingeniously destroyed by mismanagement of light and shadow upon which form depends, by the use of bad lens and worse manipulation, and by the exaggeration of the tendency in photography to mistranslate colour. These and other enormities are set down against photography; but in spite of these we apprehend that an art with such capabilities will maintain a high distinctive position of its own, however grudgingly its position in the sisterhood of the arts may be ceded to it.

The inexorable conditions which bound the photographer's powers to the production of that which his lens can see and nothing more, closes to him in the strictest sense the domain of imaginative or ideal art. But difficult as the task may seem to give embodiment to a conception of the artist's brain by the aid of photography, it has been attempted with an amount of success which may be fairly said to establish the legitimacy of the effort. Some years ago Mr. Lake Price, a painter of good position, produced some of the earliest photographs of this kind, which excited considerable attention. More recently, Mr. Rejlander, a Swedish painter, who had devoted himself to photography, made a still more ambitious attempt, and with wonderful skill made some attempts to produce ideal subjects. By a method technically styled double printing, the various components of the picture, produced on separate negatives, were printed in succession on the paper, and by skilful arrangement and combination made to form one harmonious whole. He has more recently devoted himself to the production of *genre* pictures by the aid of photography, many of which tell a story, or express a sentiment, with more force, truth, and beauty than half of the similar attempts made with pencil and canvas. Boldest and most successful, however, of those who have made photography subservient to their conceptions of pictorial art is Mr. H. P. Robinson, a gentleman who has attained a high position as a portraitist. His success in what may be termed the purely pictorial applications of photography has been most unequivocal, and has been due not less to his judicious choice of subjects suited to the powers of the art he employed, than to the culture and skill he has brought to bear on its application. Eschewing imaginative art as the legitimate ground of the painter, he has devoted himself to a field in which photography may be applied without challenge, the rendering of characteristic scenes of English domestic and rural life, in which he has achieved very high success, and has illustrated very nobly the capacity of this method of delineation for realising, within certain limits, the conceptions of the artist, and the photographer's power to select, arrange, and compose from various materials a perfect pictorial whole. If Zeuxis of Heraclea were permitted to employ five models from which to select the beautiful parts in each to complete the picture of one beautiful woman, surely the photographer may have the privilege of the painter, and produce his picture piecemeal, if he can justify his claim by presenting a successful result.

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* *British Quarterly Review.*

THE PRINT.

BY PROF. TOWLER.*

The next operation, the moment the sensitized paper is perfectly dry and lies flat, is to subject the paper to the actinic impression. But if the paper is not uniformly and perfectly dry, it will not lie flat beneath the negative; for as soon as it is exposed to the rays of the sun, some portions will dry more quickly than others, and, as these portions contract as they dry, ridges will arise on the surface in spite of the pressure from behind, and will inevitably spoil the print. Be sure, therefore, that the sensitized paper is quite dry before it is placed beneath the negative; and when it is quite dry, we find it to be an excellent plan to submit it to pressure between the leaves of a blank writing-book for an hour or two. By so doing, there will be no fear of imperfect apposition between the negative and the paper afterward.

It is alone from strong and vigorous negatives that we can obtain vigorous prints, and that we can print according to rule; in all other cases you will have to print according to the circumstances of the case, and thus do the best you can. The rule that we follow, with a good negative, is to print until the whites begin to be tinged and the shadows to be bronzed. By this time all the intermediate parts—in fact, every part—will have received all the effect of light that will be necessary to produce a brilliant picture. If the negatives are very thin, that is, if the shades have not been made opaque in the development, although the picture all the time is full of detail and middle tint, yet they are not in a condition to produce good prints. You have not the means of controlling the action of light through the transparent and thin middle tints; and by the time the picture is printed, which will be very soon, the whole surface will begin to be fogged if the action is continued. But the action requires to be continued in order to produce vigour; for vigour is obtained by internal printing—printing in and through the albumen film, and not alone on its surface. If, therefore, you print only until the picture is perfect and before the whites are stained, and your negative is very thin, the picture will bleach out more or less in the toning and fixing operations, and become feeble and exceedingly unsatisfactory. But if you have followed our instructions in the preparation of the negative, you will be enabled to produce vigorous prints, such as the public esteem, and such as you yourself will be satisfied with after you have the proper amount of experience.

When you examine the progress of printing, be careful not to injure the negative with your nails as you raise the paper from the negative. You will be more liable to produce the injury alluded to, if the paper is smaller than the negative; if the paper be of the same size or slightly larger, there will be no danger of scratching the collodion film. When the paper is smaller, you may frequently detach one corner, or some other part of the print, by simply blowing upon its surface, and then the corner may be raised easily without doing any injury.

Do not examine the progress of printing in the direct rays of the sun, but go into some remote corner of the room, where the light is feeble.

As soon as the prints have arrived at the stage indicated by the rule above given—that is, when the shades begin to be bronzed, and the whites to be stained—take them out of the printing-frame, and cast them into a drawer to which light has no access, until you have finished printing for the day or the occasion.

The printing being now completed, you may proceed and trim the prints in a feeble light. If the prints consist of card pictures, it is advisable to cut them to the proper size at once by means of a card-cutting machine, or stamp. If you do not happen to have such a machine or stamp, you must prepare a piece of glass of the size of the card picture, and grind its edges perfectly straight, smooth, and rectangular to each other. The print is then placed upon a thick plate of glass, the glass form is next placed in position upon its surface, and you then proceed around the edges of the glass form with a sharp-pointed penknife, and thus cut off the excess of printed paper. These cuttings are to be preserved in a large box or drawer, until the accumulation is so great as to require their removal. In this case you burn them in a clean stove, and carefully collect the ashes.

It is almost as easy, perhaps quite as easy, to lay the glass form upon the print, and then, holding both firmly together between the two first fingers and the thumb of the left hand, the operator clips off the edges with a pair of long shears. This method is by far the most expeditious of all other methods, and, with proper care, it is the best.

In like manner the excess of print may be thus cut off from any other form of print. The object of thus trimming the prints before they are toned and fixed, is to economise in these operations by submitting to the toning and fixing solution only those portions which are to be toned and fixed.

The trimmed prints are now immersed in a vessel of rain or spring water, in which they are kept in motion for five minutes. The water is then poured into a large tank containing a solution of salt, which reduces the nitrate silver obtained from the prints into the insoluble chloride of silver. Fresh water is poured upon the prints; the latter are moved about and turned over in the water again for five minutes. By this time most, if not all, of the free nitrate of silver in the prints is removed; and the latter are now ready for the toning operation.

We prefer toning with chloride of gold alone, or with the double chloride of gold and calcium, or of gold and sodium; and we prefer preparing ourselves the gold salt in question. For this purpose a mixture of nitro-hydrochloric acid is first prepared by adding one ounce of nitric acid to two ounces of hydrochloric acid; this is the aqua-regia of the apothecaries. The mixture is placed in a large evaporating-dish, which is made to swim on a pan of boiling water. A given weight of gold leaf, clippings, or filings is now added in excess, and left to the action of the acids at the temperature of boiling water until the whole becomes nearly a concrete mass. An ounce of hot water is now added; and powdered chalk is thrown into the solution as long as there is any effervescence, in order to neutralize any free acid. By proceeding in this way, there will be three salts in the solution, namely, chloride of gold, chloride of calcium, and nitrate of lime. The undissolved gold in the solution remains in the dish when the fluid portion is poured off. A little nitric acid will dissolve any chalk that may remain amongst the gold; after which the latter is washed, dried, and weighed. The difference between its present weight and that at the beginning of the operation will give the quantity of gold in the chloride; and from the quantity of the metal gold dissolved we may easily derive, from the equivalents of gold and chlorine, the quantity of the terchloride of gold in the solution. The equivalent of gold is 197, and of three equivalents of chlorine is 107; their sum is 304. Therefore, for a given weight of gold dissolved (say 100 grammes) we use the proportion : 197 : 304 : : 100 to the quantity of the terchloride of gold produced. By working out the proportion we obtain 154 grains of the gold salt; that is, the gold in the form of chloride is about 50 per cent. more weighty than the gold dissolved.

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* Continued from p. 464.

Keep the double salt dissolved in the ratio of ten grains to each ounce of water. In this form it is always ready for use, and its strength is always the same.

Toning Solution.

Rain-water (one quart)	32 ounces
Gold solution	1 ounce
Alcohol	1 ,,

If you do not prepare your own gold salt, use a fifteen-grain bottle of the ordinary chloride of gold of commerce, and neutralize the solution with carbonate of soda. Naturally, weaker and stronger solutions can be prepared by using less or more gold salt for a given quantity of water.

The tone of the print is modified by the salt which is combined with the gold salt or added to the solution. Thus, with the above toning solution, the prints will be of a rich sepia tone; whilst a warm purple may be produced by using the ordinary gold salt as follows:—

Rain-water	32 ounces
Chloride of gold	15 grains
Citrate of soda	1 ounce
Alcohol	1 ,,

A rich tone, approaching a black, may be produced by the following toning solution:—

Rain-water	32 ounces
Ordinary chloride of gold... ...	15 grains
Acetate of soda	1 ounce
Alcohol	1 ,,

The well-washed prints are immersed in either of the preceding toning solutions.

The washing, toning, and fixing of prints must be conducted in a feeble light, otherwise the prints will be injured. The nature of the injury is manifested by a greyness in the body of the paper, which cannot be removed by any amount of subsequent washing. Whilst the prints are in the toning solution, they are kept in continual motion by turning them over and about until the operation is complete. In very cold weather it is an advantage to maintain the toning bath at a temperature of sixty or seventy degrees, or even as high as blood heat, or one hundred degrees. A higher temperature would be apt to stain the prints.

Remove the prints from the toning solution before they assume a bluish tone, or even before they begin to be affected with this tone. If the first toning solution be used, the prints may remain until the tone is a deep sepia. Such a tone, however, can only be obtained by a vigorous print. Weak prints will soon pass the faint sepia, and will become weak and blue. It is difficult to manage weak prints in any way whatever, but much more difficult to make them look decent after toning and fixing.

As soon as the desired tone has been attained, the prints are removed from the toning solution, and immersed in water, in order to remove the gold solution, after which they are transferred to the fixing bath, which is prepared as follows:—

Fixing Solution.

Rain-water	32 ounces
Hyposulphite of soda	8 ,,
Alcohol	1 ounce.

In this bath the tone of the print is changed at first, and becomes more red; by the time that all the unaltered chloride of silver is dissolved, the original gold tone returns. In about ten minutes the whites of the prints will be quite clear, and the tone will have returned. In all cases you must be regulated by two circumstances: you must keep the prints in the fixing solution until the whites are perfectly white, and until the original tone produced by the gold solution has in a great measure been restored. Both the toning and fixing solutions may be used over again several times in succession, taking care, of course, to add more chloride of gold to the one, and of hyposulphite of soda to the other, as occasion may require.

The alcohol prevents blistering in the albumen film; but you may first try and tone and fix without this expensive article; if the paper comes out all right, you need not employ any alcohol; but if there is any tendency to blistering, the remedy to be applied is alcohol.

The fixed prints are now taken out of the fixing solution, and placed in a tub of water, or in a stream of water, in order to remove every trace of the hyposulphite of soda. If you place the prints in a vessel full of water, the latter must be changed several times in the course of six hours, before you can accomplish the end in view. Finally, let them soak over night in a fresh supply of water. After a thorough washing in this manner, the prints are taken out and placed upon a clean sheet stretched on a frame like a quilting-frame, and left to dry. When dry, they are ready for mounting.

(*To be continued.*)

Talk in the Studio.

The Photographic Society.—At the next meeting of the Photographic Society of London, to be held on Tuesday night, in King's College, the ex-Lord Chief Baron, Sir Henry Pollock, Bart., will distribute the medals to the claimants to whom they have so long been due. Mr. Dallmeyer will also read a paper on an important optical discovery, placing a most valuable power in the hands of photographers.

Edwards *v.* Cardigan.—The decision in an action for slander, instituted by Mr. Ernest Edwards, photographer, against the Earl of Cardigan, and which, by consent of both sides, was referred to the decision of Mr. T. R. Williams, has just been brought to a conclusion in favour of Mr. Edwards, who receives £100 damages, and all costs. There are some curious questions arising in the case, upon which we shall, on a future occasion, have a few words of comment.

Photographing Artificial Lightning.—M. Robin, the conjuror, has lately introduced into his *séances* a very successful imitation of lightning. *La Science pour tous* says the electricity may be observed accumulating on the two surfaces of a cloud, discharging itself, and circulating on metallic chains round the hall; and notwithstanding the instantaneity of its flight, it has been found possible to photograph it.

An Episcopal Photograph.—A somewhat amusing correspondence appeared in the daily papers a few days ago. "S. G. O." (The Rev. Lord Sydney Godolphin Osborne), writing on Ritualism in the *Times*, charged the bishops with countenancing it, and mentioned a recent photograph of a popular bishop in full robes, pronouncing the Benediction, as illustrating his remark. A day or two after, a "Man About Town" wrote, laughing at "S. G. O." for being deceived by what, he said, was palpably, to the commonest observation, a lay figure dressed up to produce pictures for sale. This "Man About Town" was too knowing by half, for the next day a letter appeared from the private secretary of the Bishop of Oxford, admitting that the portrait was his Lordship's, and defending its production. So much for the lay figure! We subjoin "S. G. O's" description of it. He says:—"I have had before me a photograph of one of the most active of our bishops, one who, I am sure, would publicly deny that he in any way countenanced Ritualism. I am, however, of a very different opinion; I believe his peculiar action in the matter in his diocess, and the countenance he has given elsewhere to those who do favour it, has done a great deal to promote it. His portrait (price 1s. 6d.) goes far to confirm me in my opinion. He is represented in full robes; in his left hand a lofty, most ornate crozier, or pastorial staff; his right hand is raised, the fingers positioned according, I presume, to some episcopal Directorium; the little finger and the next turned into the palm of the hand, to meet the thumb; the two other fingers held up, but slightly curved. I am particular in detail, because it is quite clear he stood for his likeness in the act of giving the blessing, and the whole representation is just that of a bishop of the Eastern or Western Church performing that act; it is Episcopal Ritualism, from life. What fortunate artist received that blessing, thus caught by sun power in its giving, I do not care to publish. I have some acquaintance with this bishop. I and all his friends must regret the severity the treacherous operation threw into his usually benign countenance; if Balak the son of Zippor had seen Balaam so limned, he would have scarce asked him to denounce, not bless; the Prophet blessing would have been a terror."

The Report on Indian Negatives.—Some weeks ago we gave an account of a report made by a committee of practical and scientific photographers on the cracking of certain negatives taken in India. We have since received a letter from the gentleman by whom the negatives were produced, who expresses surprise that he was not summoned to give evidence before the committee, as he alone was in possession of most of the facts; and he dissents from the conclusions, which he considers drawn from insufficient evidence. There appears to have arisen among the parties concerned—namely, the proprietors of the negatives, the producer, and the printer—some uncomfortable misunderstanding, involving much personal feeling, the producer of the negatives and the representatives of the Bombay Government being apparently strongly at issue in the matter. This part of the business is not, however, of public interest. We are now requested to state that the negatives were produced under very difficult circumstances in India, where climate, water, &c., are against successful photography—a circumstance which can readily be understood; that the plates received no preliminary coating; and that the wet plates had cracked equally with the dry ones. This last point is distinctly denied by the printers, who state that the peculiar cracking is confined to the dry plates: a few of the wet plates had exhibited cracks, but these were of the well-known character, in which the film first rises in honeycombed ridges, and then cracks, quite unlike the singular cracks of the collodion film, whilst the varnish remained intact. It is also stated that some negatives, taken years ago, kept good until after they had been taken to Goozerat, but had since then cracked. The opinion of the producer is, that the cracking is due rather to the unequal expansion and contraction of glass with the film of collodion and varnish, than to anything else. This conclusion implies a supposition that a plate of glass is a more elastic body than a film of collodion, and that the glass will bear expansion and contraction, without injury, which will split a collodion film in many cracks—a somewhat improbable conclusion, we fear.

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To Correspondents.

X. Y. Z.—In reducing sulphide of silver, dry it thoroughly first, then mix with an equal weight of nitrate of potash, and throw it, a little at a time, into a red-hot crucible. When the crucible is full, cover it up and make up the fire, maintaining a strong heat for half an hour. By this time the bulk of the sulphur will be burnt away. Now take a mixture of nitrate of potash and carbonate of soda (chiefly the latter), and adding it to the contents of the crucible, again cover up, and maintain the heat for a couple of hours. 2. As a flux for reducing chloride of silver, use equal parts of carbonates of potash and soda, and of this mixture add to the chloride an equal weight, mixing well. 3. It will require about half an hour at a nearly white heat. 4. Gold precipitated from old toning baths should be again converted into chloride by means of aqua-regia. 5. Pure silver is worth about 5s. 6d. per ounce. In recovering the precious metals from residues, some experience is necessary to perfect success, and as many things depend on observation. You will find in our forthcoming Year-Book very clear and simple instructions on the subject by Mr. Spilier, of the Royal Arsenal.

Querist (Islington).—We will make the enquiry. In speaking of giving "imperfect results," you should have stated the nature of the imperfection. We could then have told you whether the defect was due to the developer, exposure, manipulation, &c. 2. A strong solution of alum will make gelatine insoluble.

Thomas Ayers.—We do not know M. Tremaux, and cannot explain the circumstance. 2. Your difficulty in developing with plain pyro, like that of Dr. Towler, is very curious, and we cannot explain it. Did you use a freely bromized collodion? Are you certain you did not omit to add the silver to the albumen solution? Iron has occasionally been employed for developing dry plates, and answers with some; the general difficulty is a tendency to fog.

B. J. E. (Wrexham).—We are not in possession of more information on the subject than we give in our leading articles. See leader in this number. We will keep your offer in mind.

Luckrn (Aberdeen).—Nitrate of silver might be formed if the heat were suffered to arise considerably higher than the fusing point; but it is not improbable that the discolouration is due to some trace of organic matter. Mr. M. Lyte's method of purifying will probably give you good results. Dissolve in the smallest possible quantity of boiling distilled water, and add one per cent. of nitric acid. When cold, the crystalline powder found deposited is to be washed with distilled water containing ten per cent. of nitric acid. The salt obtained is very pure. 2. We have not tried the plan of floating albumenized paper on a solution of carbonate of soda. It is only said by Mr. Gage to be of use when yellow spots arise from a decomposition of the albumen generating acidity. Bicarbonate of soda would serve.

J. S. D.—Duly received, and shall be duly attended to.

A Subscriber.—We preserve no record of the questions asked by correspondents, and cannot of course give you any account of the substitute for a glass-house upon which our opinion was asked in June, 1864. If you forward a description and diagrams of the plan you are about to adopt, we shall have pleasure in giving you any hints on the subject which may occur to us.

A. H. Fry.—The use of hydrochloric acid, either alone or in conjunction with common salt, is better than the use of common salt alone for precipitating the silver from waste nitrate baths, as chloride of silver is slightly soluble in a strong solution of a chloride of an alkaline base.

An Eight Years' Subscriber.—If the picture in question be an absolute copy of your copyright photograph, you have a simple remedy. You may proceed by applying to a magistrate for a summons, and the case will duly come for hearing. You should, however, be quite satisfied that the picture is really a piracy of yours before proceeding, otherwise you waste time and money, having all expenses to pay if the case be not made out.

G. R. Gill.—The larger the condenser (other things being equal) the more rapidly you will work. The condenser generally used with the solar camera has a diameter of nine inches and a focus of eighteen inches, the form being plano-convex. 2. The reason of the image appearing sunken in your large pictures, and not in your small ones, is doubtless due to the difference in the texture of the paper used. The large paper is doubtless too soft and absorbent. To remedy this you may add more gelatine to the salting solution, so as to keep the image on the surface. 3. We like turning up the edges of the sheet, so as to make it form a dish, and then rapidly covering the surface by pouring the developer over it. The use of a piece of Canton flannel, containing a little nitrate solution, for applying the developer more forcibly to certain parts requiring depth, is very valuable.

B. F.—The flatness of the print you enclose is apparently due to over-exposure. The use of a very strong developer will often give similar weak images; reducing the strength of the developer is then an obvious remedy. The use of an organico-iron developer, either containing sugar or gelatine, would aid you in securing more contrast. Intensifying after fixing aids in increasing contrast under such circumstances.

P Taolis.—Thanks. We appreciate your zeal, but are satisfied that to succeed the matter must be begun judiciously and without precipitation. We hope to see it eventually so managed. 2. You are slightly in error; there is no allusion to analysis. There is scarcely need of further reference to it.

Lux et Salus.—We will endeavour to try the formula at an early opportunity, as you wish, before inserting the communication. We shall also remember your wants, if occasion serve.

Sir J. J. Coghill.—We will write in a few days.

A. J. T.—We know of nothing better than Newman's water colours for the purpose. We have no certain knowledge of the others you mention.

B. J. Edwards.—Received. Thanks. Letter in our next.

C. E. Elliott.—In our next.

Received: "The Photographer's Guide in the Gallery and in the Field," by Dr. Towler.

Several articles in type are compelled to stand over until our next.

Several Correspondents in our next.

All Communications for the Editor to be addressed to 15 and 16, Gough Square, Fleet Street, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 432.—*December* 14, 1866.

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INTERNATIONAL EXHIBITION OF 1867.

We are glad to inform our readers that the authorities at South Kensington, having been made aware of the inconvenience to English photographers of the existing arrangements for exhibitors, have resolved to make certain modifications by which, we believe, the facilities to which we have referred as almost imperative to enable English photographers to present a worthy appearance at the forthcoming Exhibition, will be afforded. The precise details of the modified arrangement are not yet determined; but a resolve to meet the convenience of photographers as far as circumstances will permit has been readily and gracefully expressed. A new circular of instructions, expressly arranged for photographers, will shortly be issued, and will contain details of the intended plan. In the meantime, we may state that we have reason to believe that in the contemplated plan English photographers will be relieved from the necessity of employing agents in Paris. It is probable that arrangements will be made for receiving all the pictures in London, transmitting them to Paris, and taking all proper charge of them there. The English Commissioners will also, it is probable, appoint a person to superintend the hanging, with a due regard to the advantage of English exhibitors. It is possible that arrangement may be made for putting the glass in all frames in Paris, to save the risk, &c., of breakage in carriage; but this is not definitely determined. Should combination be required to effect any desirable purpose beyond the powers of the Commissioners, it is clear that it must take place amongst photographers themselves; but in such case the necessary steps will, we believe, receive aid and countenance from the Commissioners.

[Since the above remarks were in type, we have received a letter containing valuable information, which will be found in another column.]

THE *TIMES* ON PHOTOGRAPHY.

The task of refuting some errors seems to be like the labour of Sisyphus, ever beginning, and never ending. The notion that photography is simply a mechanical thing has been received as one of the canons of the art-critics, and it seems that nothing will eradicate it. It is in vain to point out that photography is simply a series of appliances for producing a given class of pictures: that in the hands of an artist these appliances will produce works of art, and in the hands of a bungler will produce worthless smudges; just in like manner to painting, sculpture, &c., when in similar hands. It is in vain to point to the works of able photographers, and receive the momentary admission that their works are true art. On the next occasion the parrot-cry of "mechanical process" is raised, and photography and photographers are alike thrust out from the community of art.

The *Times* has frequently been very just to photography, and shown a high appreciation of its real worth. In a recent article, however, entitled "Christmas and Photography," reviewing some Christmas books, in the midst of some good remarks there is so much of the confused thought, bad logic, and general misconception that, although we are almost weary of the task, we feel it our duty to point out its error, and protest against its spirit. If this reiterated mis-estimate of photography be permitted to pass without protest even amongst photographers, there is danger that they will gradually themselves acquiesce in their own degradation, and accept a decision as to the claims of their art which may acquire recognition, not through its truth, but in consequence of its iteration. We will make some extracts from the article, and comment on them in passing. It says:—

> "The photographer may claim this year more than his share in the display of Christmas-book manufacture. Out of seven showy volumes, intended as 'suitable presents for the season,' no less than five are collections of photographs. There is an old saying, which people repeat from mere force of habit, that 'photography is an art still in its infancy.' Photography, however, should by this time have reached its years of discretion. It ought to be tired of hearing itself called a 'wonderful discovery,' seeing what a commonplace thing it has become. It may be important, however, to set a proper value upon photography. Its office should be not merely to cheapen, and popularize, and vulgarize art, but also, and chiefly, to enhance its worth, by relieving it of much of its mechanical work, and driving from it that mediocrity which is equally detestable to gods and men. In the real interest of art it is well that photography should monopolise as much as it can of what is called art manufacture. With anything that the sun can do man has no chance to cope; for nature must always have a more intimate knowledge of her own materials than any imitator using them at second-hand. Wherever photography can be at all applied, it proceeds with a minuteness and accuracy which must needs drive any amount of human skill and patience to despair. Nor is it merely by this process that nature has been made subservient to art. There can be no surer perspective than may be obtained through a camera obscura; nor is a mere *silhouette* on the wall to be excelled in the delineation of the most exquisite profile."

So far so good. We will not now discuss the questionable perspective doctrine, upon which much might be said; but it does not affect the question which now concerns us. But let us take the next delicious bit of logic:—

> "Luckily for man, however, the sun, as a created thing, has no creative powers"

It is here assumed that a created thing can have no creative powers: the sun, as a created thing, has none. Let us syllogize the argument. A created thing has no creative powers: the sun is a created thing; ergo, the sun has no creative powers. The argument is perfect. Let us try it again. A created thing has no creative powers: a man is a created thing; ergo, a man has no creative powers! As the *Times'* argument thus demolishes the possible existence of creative powers in man, it is not, perhaps, worth dwelling further on the subject. It is necessary, however, to point out the confusion and limitation of thought involved in the remarks generally. It is implied here that there is no art but creative art, imitative art being entirely ignored. It is further implied that the sun is the actual producer of a photograph, instead of the dispenser of a power to be used, controlled, and regulated in its action by the skill of the artist, who uses light as his pencil. The same fallacy underlies the next sentence:—

"It is a Force, and not an Intelligence. Matter can be shaped or shape itself into the most faultless form, but its life is dependent on the Promethean spark, and for this it is necessary that the true artist should accomplish the eternal theft."

Of course, sunlight is a force, and not an intelligence, as the painter's pigments are colours, and not intelligence; but the force or the pigments require to be used with intelligence in producing pictures. It is not worth while to push the Promethean simile too closely home; but surely the photographer has literally stolen his fire from heaven, if doing this constitute the true artist. The next sentence is worth attention:—

"The whole difference between the stone-cutter's work and the sculptor's lies not unfrequently in a single touch, but that touch constitutes a world-wide difference, and it is precisely that which no photographic industry can ever attain."

The writer here shows that the power of cutting stone does not make a sculptor. The art-faculty is in the producer, not in the materials or the method of working them. This is precisely the whole position for which we contend. It depends upon the man whether the results of his labour shall be a work of art or not; whether he practice stone-cutting, painting, or photography. Again:—

"It will never rise above the dignity of a 'wonderful mechanism.' As a portrait-painter, for instance, in his own stiff, unflattering way, the sun cannot miss a likeness. Place the original in the proper focus, give it the benefit of the most favourable light, allow precisely as many seconds as the atmospheric conditions require, and the result is infallible. You will have a perfect petrifaction of the face, and even as much of the expression as the sitter chose or was able to assume and keep up during the ordeal. Of course the soul is not there, except now and then by the merest chance; for the negative has none of its own to give back in reflection; there is no more of the true inner life in a photographic portrait than there is of the real movement of a musical strain in the performance of even the most perfect hand-organ. The eye or the ear may be deceived by the counterfeit, but the heart never."

Here again is the old fallacy: the photographic portrait will have no soul, because the 'negative has none of its own to give back in reflection.' The most perfect possible portrait must mirror the original without the slightest variation, omitting nothing and adding nothing. It would be a poor recommendation to a mirror to say that instead of giving back the perfect reflection of an object, it added something of its own not in the original. If it be desired to have flattered portraits, if it be desired that into the picture of a soulless face the painter shall transfuse some of his own soul, and produce a picture, not of what the sitter's face really presents, but what the painter thinks it might present, well and good; only let it be distinctly acknowledged that the painting possesses something extra which the painter has added, not that the photographer has omitted something which the original possessed. In the remarks on the production of casts, the same kind of error prevails:—

"By a new process, it is announced, photography will be made to reproduce colours as well as light and shade, but even that will not materially raise it from its mechanical level. Could it even render our image precisely as we see it in the glass, it might undoubtedly answer some of the practical purposes of art, but it would have nothing to do with its life-breathing powers. Any plasterer can take a cast of a child's hand or a woman's foot; but it will yet be a long way from sculptor's work."

If the aim were to produce an absolute *fac simile* of the foot or hand, the cast would be most perfect; but if a beautified model were required, then the work of the sculptor would be best. Here the whole question depends on the aim. But the production of a cast has no analogy with the production of a photograph. In casting, nothing is left to taste or artistic knowledge. In photography, the arrangement, position, lighting, all demand artistic culture before the process of photography is commenced; and in the manipulation of the process, unless the operator have a keen appreciation—artistically—of the effect he wishes to produce, he will fail. In every step some culture and appreciation of pictorial conditions are absolutely necessary to successful results in photography. In the next paragraph there is little to object to, and something to endorse:—

"Within its mere earthly limits, however, even with the material difficulties against which it has still to contend, and the more serious obstacles it will never overcome, photography achieves much by itself; and it does even more by helping the mere bungler in his mechanical toil, and by gradually lightening much labour, which it may in the end altogether supersede. Whatever may be the sun's merits as a draughtsman, there is no doubt that he will engross a good deal of the steel, wood, and stone engraver's work. We have heard of a new discovery in America, announced under the name of 'graphotype,' in which something answering all the purposes of a woodcut may be obtained by simply drawing the lines on a plaster-block with silicated ink, which hardens to the solidity of flint, and, on simply brushing away the plaster-ground, leaves the block ready for the printer; but the process, however clever, and allowing for any degree of excellence in the art of design, cannot come up to photography either in facility or expedition. The basket-seller who stole the baskets ready-made could always offer his wares a greater bargain than he who only stole the osier. Photography steals the drawing as well as the engraving. Hence it was from the very outset placed in a position to undersell every other branch of more artistic trade, and will easily become the cheapest and most handy of book illustrators."

In the further comments, the writer remarks, that the gift-books got up with illustrations by the new art are not such as will generally recommend it to the public, a remark which we regret to have to endorse. We have not seen the works under notice; but we are compelled to add that, as a rule, photographic book-illustrations are amongst the worst examples of the art. On reading the following remarks on photographic reproduction of engravings, we cannot help feeling that the photographs must either be very badly executed, or produced from imperfect and worn-out engravings, as a really perfect photographic copy of a good engraving need be little inferior indeed to the original, except in the question of texture.

In the last paragraph which we shall quote, we find the reason suggested, we fear, why photography is often subjected to adverse criticism. Neither photography nor literature is the best available, but too often the cheapest the public will tolerate: a great error, we venture to think, even in a commercial sense. Here are the writer's concluding remarks:—

"Photography, itself a kind of printing process, seldom excels in the reproduction of mere prints. The 'Great works of Raphael' in the various European galleries are seldom accessible to the photographic apparatus. What we have here before us is a series of thirty photographs, not from the paintings, but from the best engravings. Real photographs of the Madonna di San Sisto' of Dresden hang on the walls of many a house in England, and we are not sure that such a mere shadow of the divine picture is not better worth having than any copy or print. Nay, we are not sure that a really good photograph of what the real original *was* might not be something more agreeable to look at than some of Raphael's originals as they now are.

"We need not waste any words with respect to the mere letterpress of these books. Almost anything old and flat that can be found to have any connection with the subject will answer the purpose. Literature is here made the mere handmaiden of art, and both are, after all, made not so much to instruct or to amuse as to sell."

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ON THE PRODUCTION OF HARMONIOUS NEGATIVES.

BY M. CAREY LEA.*

When the photographer has mastered the regular manipulations of the art, and can trust to the uniform and regular working of his chemicals; when he has provided a glass house of proper construction; and when he has attained proficiency in lighting his sitter, he is apt to consider that he has done all that is necessary to insure success; and, in many cases, success doubtless follows his efforts. But he is liable to frequent and disagreeable surprises. Failures unexpectedly follow successes without assignable reasons. He soon finds that these failures depend, not on faults in his chemicals, not on defective arrangement of his lights, or on bad taste in the position of his sitter, but on certain intrinsic difficulties in the sitters themselves; difficulties that may, to some extent, be obviated by ingenious arrangements of light, but which, after endless trouble in this respect, are but very imperfectly conquered.

It is not intended here to affirm that it is possible to arrive at an equal success with every description of complexion, features, and apparel; but, at least, a very important alleviation of these difficulties lies in a direction to which sufficient attention has not been hitherto given,—to the regulation of the development of the negative, in accordance with the actinic qualities of the object to be photographed.

SOURCES OF BRILLIANCY AND DETAIL.

In order that I may make my meaning both plainer and more easily retained in the memory, I must commence with a few very brief remarks upon the chemical nature of the phenomena of development.

When a solution of nitrate of silver is brought into contact with one or other of certain reducing agents, such as protosulphate of iron, pyrogallic acid, &c., metallic silver is precipitated; that is to say, the silver, previously held in solution, passes into a form insoluble in the liquid, and is let fall by it. Now, it is a general rule in chemistry that the slower the precipitation the larger the particles precipitated are found to be. When precipitation is exceedingly slow, it frequently takes the form of crystallization, and the separating substance assumes forms of considerable size. Precisely the same thing, though to a lesser extent, happens when an ordinary precipitation is retarded; the particles that separate have time then, as it were, to find each other, and join together. No precipitate consists of ultimate atoms, for as these atoms pass through the liquid, others, just ready to fall, attach themselves to the first.

When an impressed plate is covered with developer, if that developer be a weak one (that is, if the precipitation of the silver be slow) the particles have, as it were, time to choose, and attach themselves in preference to the strongly impressed part, whilst those portions of the image which have been weakly impressed receive less than their due proportion.

This species of development therefore tends to hardness and excessive contrast. When properly subordinated it gives brilliancy.

If the same impressed plate be covered with a strong developer (that is, if the precipitation be a rapid one) the particles have less time to seek out the strongly impressed portions, but deposit themselves more uniformly. They thus tend, if this be carried to an extreme, to produce too grey and uniform a plate, wanting in force. When properly subordinated, this development gives detail.

Finally, if the developer be altogether too strong, so that the precipitation is immediate, the particles have no time to obey the attraction of the impressed image, but deposit themselves also in unimpressed parts, and the result is fogging.

Such is, expressed as briefly and as little technically as possible, the chemical principle involved in development; and a clear conception of it, simple as it is, must be of the greatest value to every photographer, and especially to the portraitist, its application to whose needs I shall now proceed to consider.

APPLICATION OF THESE PRINCIPLES TO DRAPERY.

The great principle of development which follows from the above, and which I believe I was the first to point out, is, that whilst a strong developer tends to produce detail in the dark shadows, as originally shown by Mr. Wharton Simpson, a slow development tends to perfect the detail in the high lights. If there be a mass of very white drapery but little relieved by shadows, it will necessarily impress itself very strongly upon the sensitive plate. If now we apply a strong development, the precipitation will be too rapid to distribute itself exactly according to the ratio of impressment. Accordingly, the very faint shadows will be lost. They will tend to be as dense as the high lights, and to so print themselves on the positive paper, no matter what care be taken to the contrary. But if a slow and graduated development be applied, the particles of silver will be subjected to the respective degrees of attraction, and will fall proportionately to it. In this way the degrees of tint which are only a shade below the highest lights will preserve their relative proportions. On the contrary, in a mass of black drapery (and with very non-actinic colours even when not black) there will be but little actinic impression. And if the development be a very slow one, especially if the light on the sitter was not very strong, some portions of the drapery may be represented on the negative by clear glass. Such work, of course, will look miserable when printed; but with a powerful development the want of impression is to a large extent compensated by the rapidity of precipitation, and detail in the dark shadows is brought out which could not be by a slow development.

APPLICATION OF THEM TO THE FACE.

The foregoing illustrations were taken in the case of drapery, as being simple, easily understood, and forming an easy introduction to other cases; but they are of universal application. The human face, as it presents itself in relation to photography, may be divided into three classes. 1st. Those in which there is a moderate or average degree of actinic contrast. 2nd. Those in which there is unusually great contrast. 3rd. Those in which there is unusual want of contrast.

The first of these cases presents no difficulty. It comprises all those faces, in general, in which success comes easily. With the other two it is a different matter; and my object in this chapter is to point out how the best results can be got in spite of the difficulties which here show themselves. Let us consider these cases separately.

Second case. *Excess of Contrast.*—To this head belong very fine, clear, white complexions, with dark hair; red or ruddy complexions, with grey, and still more with very white hair.

Here the excess of contrast requires to be softened by the use of a powerful development, or else the picture will be harsh and unpleasing. A developer rich in sulphate of iron, and with but little restraining material, is indicated as the proper treatment of the negative. And if the contrast is very great, it may be advisable further to subdue it by a prolonged exposure. But the operator cannot too carefully observe that a long exposure, aided by a powerful development, acts so strongly in reducing contrast that, unless he is careful, he may go to the opposite extreme, and get too tame a picture. Such a result he must not ascribe to the directions here given, but to an exaggerated application of them.

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* From an American Reprint of "Newman's Harmonious Colouring as Applied to Photographs," edited, with additions, by Mr. Carey Lea.

Third case. *Unusual absence of contrast.*—To this head belong red or black hair, with ruddy or highly-coloured complexions; very light hair, with clear white complexions.

These two cases illustrate the difference between the various results obtainable by exposure and by development respectively in a very interesting manner; for it is evident that the one will require a long, and the other a short, exposure: but both will require a slow development.

The red complexion, the red or black hair, are non-actinic, and will require time to impress themselves on the sensitive film. The light hair and the clear white complexion impress themselves rapidly, and will not bear a long exposure, under penalty of a loss of brilliancy. But both these cases, otherwise so different, will require a slow development, or they will be but tame and characterless, as we so constantly see them in all but firstrate portraiture.

The few combinations whose appropriate treatments I have here explained, comprise in themselves all the most difficult problems which can present themselves, and the management which is directed will be found to be that best calculated to give satisfactory results. We have now considered the cases of drapery and of faces separately and detached from each other. It remains to investigate the bearing of the one upon the other as they present themselves together in actual practice.

COMBINATION OF DRAPERY AND FACE.

When the photographic character of the face and that of the colour of the drapery correspond, the photographer has a comparatively easy task before him if he undertakes it comprehendingly. Just in proportion as these diverge, difficulties increase, and with certain combinations may become insuperable.

We have not here to deal with questions of becoming and unbecoming colours, but purely with those of comparatively actinic force.

If the sitter's face, for example, shows a great actinic contrast, as with a clear white skin and dark hair, or with a ruddy complexion and light grey or white hair, a strong development will be appropriate. But again, let us suppose that the person is dressed in one colour, and that a highly actinic one (as, for example, white, blue, or light grey), here a weak developer is indicated. Cases like these it is impossible to harmonize. Tolerable results may be obtained, of course, though perhaps not till after repeated trials. The tendency of the picture will necessarily be to err in one or other of two directions. Either the face will be harsh and blocky (if a slow development be used), or the drapery will be flat and chalky (if a quick one be resorted to).

Again, on the other hand, let us suppose that the sitter's face shows a want of actinic contrast, as in the case of a ruddy complexion with red or black hair, or a white skin with light, tow-colored hair. And that, at the same time, the dress is a mixture of actinic and non-actinic colours, as blue and brown, or white and black, or light grey and red, or light grey and brown or green, &c. &c.,—such combinations of face and costume will present difficulties more or less great according to the differences of contrast. The tendencies here will be to err in one or other of these two directions. Either the face will be flat and grey (with a strong development), or the drapery will tend to present a mixture of white and black without half tone (with a weak and slow development).

These, then, are the difficulties of portraiture. Where the contrasts exist only in the face, or only in the drapery, the means have been here pointed out for overcoming them. But when the indications of the face and those of the drapery point in opposite directions, and call, consequently, for diametrically opposite modes of treatment, there is no mode of overcoming them, and the sitter must either return with a style of costume in harmony with the photographic exigencies of the face, or else must be satisfied with inferior work.

Difficulties of this sort will be much more felt in some galleries than in others. Those who have perfect means of controlling light at all hours of the day by large and well-constructed lattices and blinds will be less troubled than those whose appliances are imperfect. Such remedies are, however, but palliative, and cannot ever take the place of a thorough knowledge of the effects of quick and slow developments.

THE DEVELOPER.

It results incontestably from the foregoing that the system of using one developer for all purposes is radically false and vicious. It is almost as absurd as if we were to adopt a fixed time of exposure and keep to it, without reference to the amount of light or time of day. Surely it is no great trouble for the operator, besides his regular strength of developer, to keep beside him a portion of stronger and weaker for occasional use when the peculiarities of the sitter demand it.

The collo-developer is peculiarly well suited for these purposes, because the pyrogallic redevelopment which messes and spoils the beautiful iron development in bringing it up to printing strength, is avoided, and the bringing out of the picture proceeds uniformly and harmoniously. But the principle is the same with all. With every species of developer there will be strong and weak forms, quick and slow developments, respectively applicable to the cases before cited.

In conclusion, it is earnestly urged upon the photographer to make himself familiar with the principles on which the whole of this system is founded, and to bear in mind constantly these cardinal points: that

A quick development gives softness.
A slow development gives brilliancy.
A quick development gives detail in the shadows.
A slow development gives detail in the high lights.
To subdue contrast, use a strong developer.
To heighten contrast, use a weak developer.

Recent Patents.

PHOTOGRAPHIC ENGRAVING.

BY CHEVALIER HENRY AVET.

The object of this invention is to produce printing surfaces by means of photography, by another modification of the use of gelatine and a bichromate. A provisional specification for the same object was lodged by the same gentleman at the Patent Office a short time before the present one, and was then, probably from the discovery of some further important point in the process, abandoned. The method to be employed here will be best understood on reading the complete specification as follows:—

This invention has for one object to produce printing surfaces and other like surfaces. For this purpose an image is first produced, by any ordinary photographic process, on a plate of glass or other solid, transparent, or translucent substance, and on the collodion film or collodion surface of such plate is next applied gelatine, gum, or other organic matter mixed with bichromate of potash. The light acts on the organic matter through the body of the plate, so that when the parts unaffected by the light are dissolved, there remains on the plate a subject or design in relief adhering to the photographic representation or image first produced. A metal surface suitable for printing and other similar purposes (such as embossing and figuring) may be obtained by electro-metallurgy from such relief, or from an impression taken therefrom.

I now proceed to describe more particularly in what manner this may be carried into effect.

An image or representation of any desired object is first produced on a plate of glass or other solid transparent substance or

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solid translucid substance by any known ordinary photographic process. A solution (which, by preference, is a concentrated solution) is prepared by dissolving gelatine, gum, or other organic substance to which bichromate of potash is added, whereby a sensitive agent or composition is produced, so that the parts which receive the action of the light become insoluble in water or in ordinary solvents. The organic substances which may be used for making this solution are too numerous to be stated in detail, but I may mention that all descriptions of gums are proper for the purpose. The following are suitable proportions for composing the solution :—Four or five parts of gelatine to one part bichromate of potassa. I do not restrict myself to these proportions. When gelatine or gum is used, the solution is made by preference with warm water, either distilled or otherwise. A shallow edge or rim of wax is raised or formed on the plate, to prevent the solution from running off it, and to determine the thickness of relief to be formed on it. A film or layer of the aforesaid solution (gelatine or other organic substance mixed with bichromate of potash) is then spread on the plate, on the collodion side thereof; that is, on the side on which the collodion has been applied. The plate is next exposed to the action of light on the non-collodionized side; that is to say, so that the light may pass through the body of the plate to the opposite or collodion side. In other words, the plate is so disposed that the light first strikes on the surface on which there is no collodion, and then through the thickness of the plate to the collodion film or surface, and to the layer of organic substance thereon. During the exposure, care is taken that the collodion side shall not be injured. When the layers of sensitizing or organic solution are rather thick, the plate should be protected from the lateral action of the diffused light, and so disposed that it shall only catch the vertical rays. The time during which the exposure lasts is regulated by experience, according to the state of the weather, the nature of the plate, and the intended result to be obtained. After the plate has been exposed, the next step taken is to proceed in the dark chamber to dissolve the parts of the film or layer of bichromatized organic substance which the black tints or half tints of the plate have wholly or partially preserved from the action of light. When the plate is dry, the subject appears raised or in relief on its surface; its delicacy corresponds with that of the photographic representation (to which it adheres). The height of relief of the various parts of the subject so produced is proportionate to the degree of transparency of the corresponding parts of the image first produced on the plate. If the relief so produced be insufficient, the process is repeated by spreading on the plate a second film or layer of the aforesaid agent (organic substance and bichromate), care being taken first to remove any anti-photogenic tint which the plate may have acquired from the bichromate; such tint may be removed by using nitric acid, or any other ordinary known chemical process for the purpose. The subject produced in relief, as described, is then metallized by any ordinary means. For example, it is first coated with a metallizing or conducting solution of nitrate of silver, and metal is then precipitated or deposited upon it by electrotype or electro-metallurgy. Or else an impression is first taken off from the raised surface; such impression is taken in a sheet of plastic material; as, for example, gutta-percha, to which Venice turpentine and a little spirits of turpentine are added (according to the temperature at which the process is performed), and then the metallic coating is deposited or precipitated on this impression. By these means, therefore, a negative, or a positive obtained from such negative, is dealt with, and a first impression produced by exposing a plate in the camera directly on the collodion side; that is to say, the light is applied so as to reach the collodion side through the thickness of the glass. By this method, various combinations may be obtained, and the subject produced on the metallic plate, finally obtained, may be either sunken or in relief. Instead of spreading upon the plate bichromatized gelatine or other organic substance in a state of solution, the organic substance may be spread in sheets or films; that is to say, a sheet of gelatine or other organic substance is prepared like the sheet gelatine of commerce, and sensitized by mixture with a solution of bichromate of potash, and it is then applied on the plate on which the first impression or image is taken. It is placed thereon in a manner similar to that adopted in applying gelatine to paper used in taking photographic positives.

The above process is applicable generally in cases in which printing, embossing, or figuring surfaces produced by engraving or otherwise are used. A drawing, picture, or engraving made on paper may serve as an original; that is to say, as the subject of the printing surface to be produced. Such original may be on a larger scale than that desired for the required result or subject of the printing surface, and it may be reduced as desired by ordinary means employed in photography.

Engravings, drawings, maps, autographic manuscripts, and other matters may be, by these means, converted into or form the subject of printing surfaces, the subject appearing thereon either sunken or in relief.

Another application of the process relates to the figuring of porcelain, biscuit, or other transparent or translucent materials. For this purpose a photographic representation of an article presenting half tints—such, for example, as a statue, portrait, landscape, or oil or water picture—is first taken, and a relief or raised surface produced therefrom by the process hereinbefore described, and this process is carried on in such a manner or pursued to such an extent as to obtain a sharp or strong degree of relief, and the metallic surface obtained therefrom is used for figuring transparencies of china, biscuit, or other like translucent materials, thus producing thereon a representation of the original object photographed; or if the surface be in less relief, it may be used for printing in inks.

The next object of this invention consists in producing surfaces with a grain, or, as it may be called, an artificial grain. For this purpose, according to this part of the invention, a pattern or design is made by producing a photographic image on a surface, such image consisting of a representation of very fine white lines on an anti-photogenic coloured ground, or of very fine anti-photogenic coloured lines on a white ground. The lines may be produced either before or after photographing (or producing a photographic image of) the subject of the photographic work or picture on which such grain is to be represented. Or the representation of the subject or object of the grain may be produced or photographed simultaneously by using two plates.

I now proceed more particularly to describe in what manner this part of the invention may be performed. A pattern is first prepared, consisting of very fine white lines on an anti-photogenic coloured ground, or *vice versâ*. The pattern used by preference for the purpose is produced by using a large frame covered with black cloth, over which is stretched a piece of white net. A photographic negative is then made by photographing on the same plate both the net and the object to be represented; that is to say, an image of the net and an image of the intended subject to be represented are taken consecutively on the same plate. Either may be taken first. The net may be reduced to any required scale. Both are taken on the same film or surface of collodion. The two images are produced by two separate consecutive exposures. The plate is next placed in the dark room, and the images are developed, and are then fixed. The net presents a representation of regular and fine opaque lines, which do not at all interfere with the distinctness of the subject nor the delicacy of detail. From these plates, printing surfaces and other like surfaces may be obtained, by treating the said plates according to the process first herein described.

As the fine opaque lines produced by the net form an uniform reserve against the action of the light, the relief obtained on the plate necessarily forms a series of small regular dome-shaped convexities, proportionate in height to the action of the light through the tints of the image of the object. When this relief is reproduced on the metal as a sunken design, a regularly and artificially grained surface is obtained, in which the black and half-tints are regulated by the depth of the grain, or (when impressions are taken on paper) by the thickness of ink. Sometimes the process may be performed as follows:—A photographic negative of the pattern which is to represent the grain is first made, this pattern consisting of white lines on a black ground, as above explained; and a negative is also taken of the subject to be represented. These negatives are placed together with their collodion films or surfaces in contact. These are placed in a photographic apparatus constructed for operating by the transparent process, whereby an image is produced by a single operation; that is to say, with only one exposure. Printing surfaces and similar surfaces may be formed from these plates, according to the process first described in this specification. In these plates the object is positive, and the grain is formed by fine transparent lines, whence it follows that in the relief produced on them by the first-described process the grain forms small concavities, the depth of which is not directly proportionate to the action of the light through the tints of the image, but is formed by the difference between the action of light and the regular action exerted through the small transparent lines. To obtain from such a relief a metal printing surface with the subject thereon sunken, the relief is subjected to two electro-metallurgical operations, or a metal mould is first taken from it, and it is then electrotyped.

When I wish to produce a portable grained surface suitable for being used when travelling or away from the studio, a negative is taken from a pattern consisting of black lines on white ground, the design being reduced to any desired extent, In one of the two consecutive exposures in the camera, this plate is used in the transparent process, or else a positive is taken on paper from a negative taken from a pattern produced by white lines on a black ground. By these means a portable pattern-plate for a grained surface is obtained. Or this grained plate is applied on another plate with their collodion films or surfaces in contact, and a grained plate is thus obtained by a single exposure ; the image of the grain on this last surface is formed by transparent instead of opaque lines. This method of obtaining artificial grained surfaces may be applied for reproducing various subjects which present half-tints, such as engravings and lithographs.

The invention has next for object to obtain superior photographs or photographic positives. For this purpose, according to this invention, negatives produced in the manner similar to that hereinbefore described in the process for producing grained plates or surfaces may be employed when taking photographs or photographic positives or prints. By employing such improved negatives, a superior artistic effect will be obtained in printing positives or photographs on paper.]

By the expression, collodion side or surface, used in the present specification, I mean the side or surface of the plate on which the collodion film is applied. By the expression non-collodionized, I mean the side or surface on which the collodion is not applied.

Instead of using bichromate of potash for admixture with gelatine, gum, or other organic substance as above described, bichromate of ammonium may be used.

I wish it to be understood that one method of producing printing surfaces, and other like surfaces according to this invention consists in the following combination of processes hereinbefore described : namely, first, in producing an artificial grain on plates, then in obtaining a raised or sunken design or subject on such plates; and, lastly, in obtaining a metallic surface from the same, the design or subject thereon being raised or sunken, all being effected according to the respective processes described in this specification.

Having now described the nature of the said invention, and in what manner the same may be performed, I declare that I claim,—

First. The method of obtaining surfaces suitable as printing surfaces, or other like surfaces, by applying gelatine, gum, or other organic substance mixed with bichromate of potash or of ammonium on a plate of transparent or of translucent material on which a photographic image or representation has been produced, and causing the light to act on such organic substance through the body or thickness of the plate ; whereby, when the parts unaffected by the light are dissolved, a subject in relief will remain thereon, from which a metal surface may be obtained, all substantially as described.

Second. The method of producing a grain on photographic surfaces, by using a device composed of fine white lines on an anti-photogenic coloured ground, or of anti-photogenic coloured lines on a white ground, before, after, or while obtaining an image or representation of the subject of the photograph, substantially as described.

Third. The employment in photography of the modes of obtaining a "grain," substantially as described.

Fourth. The production of printing surfaces and other like surfaces by the employment of any of the processes described for obtaining artificial grain in combination with the processes of obtaining a raised or a sunken subject, and of producing a metal surface thereon, all as described.

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PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

LLOYD V. ASHFORD.

This cause came on upon motion for degree, Vice-Chancellor Kindersley, in January, 1865, having granted an injunction to restrain the publication of two prints (lithographs), being called respectively, "The Onconvanience of Single Life"—moral, "It is never too late to mend ;" and "Raal Convanience ;" or, "A wife ready an', willin' to help a man when he's bothered." The plaintiffs carry on business as printsellers and publishers in Gracechurch Street ; the defendant in Ludgate Hill. It appeared that the plaintiffs acquired the original paintings, and had them lithographed, and in March, 1864, registered them, as well as photographs of them, under the Act (25th and 26th Victoria, c. 68). In the same year they discovered that photographs of these pictures had been sold by the defendant, and a correspondence ensued upon the subject, the plaintiffs' solicitor asking for compensation ; and 15*l.* was offered but rejected ; and ultimately, on the 14th of November, Mr Bowen, the defendant's solicitor, wrote to Mr. Barratt, the solicitor of the plaintiffs, denying the copyright, and withdrawing the former offer as made under a false impression. Ultimately, in March, 1865, this bill was filed and this injunction granted until the present hearing. A great deal of evidence was read as to the practice of print publishers, and it appeared that other copies obtained by the defendant had not the publication line upon them, as required by the Copyright Acts, and the defendant contended that therefore the plaintiff had no copyright ; whereas the plaintiff insisted that these copies were mere specimen prints, and not in fact published, and had got by accident into circulation, probably in a sale by Mr. Lewis, the well-known print auctioneer.

Mr. Glasse and Mr. Waller appeared for the plaintiffs ; Mr. Bailey and Mr. Housley for the defendant.

Mr. Glasse was heard in reply.

His Honour said it was much to be regretted that this litigation had taken place. The plaintiffs had been in uninterrupted enjoyment of the copyright of their paintings till 1864, from 1855, nine years ; and when this dispute arose the defendant, very reasonably, offered compensation. But then, unfortunately, the letter of the 14th of November was written, which was, in fact, the origin of the whole litigation, the plaintiff being obliged to file this bill ; and the simple question was, whether he had or had not a copyright. It was clear that the 8th of George II. was an imperative statute, and must be complied with, and cases were cited to show this. It was also clear that, somehow or other, copies of these pictures had got into circulation, which copies did not comply with the statute. If, on the evidence, the Court was satisfied that the plaintiff deliberately (which would be simple folly) published these prints, he must fail ; if it was an accident, as his Honour thought it was, by means of some workmen, or in some other way, he must succeed ; and therefore he was clearly entitled to a copyright in these works. The injunction, therefore, must be made perpetual, and, inasmuch as the whole litigation had arisen from the letter of the 14th of November, the defendant must pay the costs.

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Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of this Society was held on the evening of Wednesday, December 5th, in Myddelton Hall, Mr. W. W. **King** in the chair.

The minutes of a former meeting were read and confirmed, and the following gentlemen elected as members :—Messrs. C. W. Courtenay, J. J. Courtenay, W. Giles, W. Bristowe, J. S. Dismorr, and A. Beckett.

After some conversation,

The **Chairman** said that he had hoped that Mr. Spiller would have read a paper that evening, in continuation of the former paper, on "Some Chemical Aspects of Photography." From press of other duties he was unable to read it that evening but would do so at some meeting early in the year. He now called attention to enlargements by Messrs. Holroyd, of Harrowgate, exhibited by Mr. How. They were produced with Monckhoven's solar camera. The pictures were very fine, and were much admired.

Two of these prints were in carbon, and a desultory conversation on carbon printing arose out of their examination, in the course of which Mr. Wergo gave a résumé of the operations.

Mr. J. R. **Johnson** stated that Mr. Braun, of Dornach, the purchaser of Mr. Swan's French patent, was working the process very successfully, and was delighted with its results.

He was erecting extensive machinery, driven by steam, for the purpose of preparing the tissue.

After some general conversation on the subject, in which Messrs. Bockett, Werge, Johnson, Simpson, and the Chairman took part, the subject dropped.

After some votes of thanks the proceedings terminated.

Photographic Society of Marseilles.

At a meeting of this Society, held last month, M. Vidal gave a summary of the more important photographic events which had taken place during the past summer.

M. Vidal commenced by referring to M. Poitevin's interesting experiments with reference to the change which takes place in the sensitive iodide film on its exposure to light. These experiments, which go a long way to prove that this change is a purely chemical one, are likewise important in showing that an iodide film may, at the moment of exposure, be sensitized by simple contact with a sensitive plate, a discovery which, if not at present of any practical value, may possibly become so at some future period.

M. Claudet's communication to the British Association deserves to be mentioned among the many efforts made to overcome a difficulty in the mechanical part of photography. By employing an arrangement for moving the lens to and fro, and thus altering the focus during the exposure of the plate, M. Claudet states that he obviates excessive sharpness, and obtains a greater depth of focus. During exposure, every portion of the model is successively brought into and thrown out of focus, and the result is a harmonious picture in which the sharp lines are softened down by a slight haziness. The idea is a very ingenious one, but before it can be universally adopted, some improvement in the mechanical arrangements will be necessary.

The magnesium light has lately been much improved by M. Larkins, who has abandoned the use of magnesium ribbon, and employs the metal in the form of powder mixed with sand, by which means he is able to obtain a constant and regular supply of the material for combustion, and increases the intensity of the light.

M. Niepce de St. Victor has been continuing his experiments with the heliochromic process, and has succeeded in obtaining black tones in the presence of colours. Although the blacks obtained are not quite perfect, still M. Niepce has produced them on a plate corresponding precisely in depth of shade to those of the model.

The President thanked M. Vidal for his communication, and called attention to a specimen of Marion's collodionized, iodized, and waxed paper, which had been sent by the manufacturer for inspection by the Society. The paper, which showed evidence of having been very carefully finished, and seemed preferable to the turpentine-waxed negative paper, was referred for examination to the Special Committee, of which M. Taylor, who has great experience in waxed paper, is a member.

A few sheets of the *Papier Leptographique* was also exhibited to the Society; it was of two kinds, one of Saxe, and the other enamelled. M. Vidal stated that he had experimented with this paper, and showed some fine proofs, possessed of a good tone, which had been produced with it; and he likewise exhibited prints before being toned or fixed. The members were much interested in the results obtained with this material, which, if it fulfil the promises of the manufacturers, will do much to simplify the photographic process. This paper was likewise referred for report by the Special Committee.

Several members stated that they had used the iron developer recommended by M. Revest, and found it answer very satisfactorily. Its preparation is very simple, 2½ grammes being dissolved in 100 grammes of water without admixture of either acetic acid or alcohol, although the addition of the two latter in small quantities does not affect the developer injuriously, but, on the contrary, adds to its efficiency.

M. Vidal communicated an important result, useful to operators interested in the dry plate process, which he had obtained in connection with the investigation he had commenced on the calculation of length of exposure. When using dry plates, the amount of exposure required cannot be judged by the time necessary to develop a trial-plate, as the impression or image loses in intensity in proportion to the length of time allowed to elapse between its exposure and development; and the trial-plate, therefore, if developed a week later, would give a different result from that which it furnishes immediately after exposure. In support of this theory, M. Vidal exhibited eight negatives taken the same day and in the same light, some of equal, and others of different periods of exposure, which had been developed respectively 1, 2, 10, 15, and 20 days after exposure. The image developed on three negatives which had been exposed for equal periods were weaker, according as a longer interval of time had elapsed before development; negatives which had been over-exposed, and which, had they been developed on the same day, would have furnished solarised pictures, gave, when developed after a certain lapse of time, perfectly good results. Thus, one plate exposed nine minutes, and another twenty-one, on the 16th October, furnished results of equal value, the first having been developed five hours, and the other five days after exposure; another plate, exposed for nine minutes on the same date, and developed after five days, gave a very feeble result.

It is necessary, therefore, when exposing a dry plate, to make allowance for the time which will elapse before the picture is developed, and, by prolonging the exposure, compensate for the loss of vigour in the impression. Any over-exposed negative may be made to yield good results, if allowed to remain some time before development. All these experiments were conducted with tannin plates.

M. Teisseire, the President, was of opinion that the nature of the developer was of great importance in developing an image, whether the duration of the exposure was short or long. He believed that a perfect image was always present on the plate, only the developer failed to bring it out; and if our developers were sufficiently powerful, there would be no difficulty in developing an instantaneous picture.

M. Vidal could not agree with this theory; he thought that a certain amount of exposure was absolutely necessary for the production of a good picture, and that it was not a question of the developer. A certain period of time must always elapse before any change can take place, as nothing occurs instantaneously; and it is very natural to suppose that a longer or shorter period of exposure is required to produce an image, according as the rays of light are strong or feeble. A drop of water takes a certain time to penetrate through a thickness of blotting-paper, and in printing from a negative a few moments always elapse before the sensitized paper, under even the transparent blacks of the negative, is acted upon by the light. Thus it is with regard to the production of an image by reflection; and when there is an insufficiency of light, or the exposure has been too short, when the collodion is not sufficiently sensitive, or the diaphragm of the lens is too small, there results but an imperfect picture, in which the lights are, shown before any trace of the shadows has become visible.

After a short discussion, in which several members took part the proceedings terminated.

London Photographic Society.

The usual monthly meeting of this Society was held in King's College on the evening of Tuesday, December 11th, Sir F. Pollock, Bart., ex-Lord Chief Baron, President of the Society, in the chair.

The minutes of a former meeting were read and confirmed, and the following gentlemen elected members of the Society:—Mr. R. J. Mann, and Mr. John Scott.

The Secretary said that in accordance with a rule of the Society, he should now announce the vacancies arising in the Council, and the gentlemen nominated by the Council to fill them. Dr. Wright retired from Vice-Presidency, and Mr. Durham was nominated in his place; Mr. Kater's place on the Council would be filled by the Rev. J. B. Reade; Mr. Durham's place would be filled by Mr. Wharton Simpson; and Mr. Hamilton's place by Dr. Anthony. The Earl of Caithness, Mr. Williams, and Mr. Claudet retired by rotation, and were proposed again for re-election.

The President put the nominations to the meeting, which were duly passed.

The President then rose, amid loud and prolonged applause, and said that he had the honour, on this occasion, of presiding on an occasion of considerable interest—the distribution of the medals awarded to those gentlemen whose works had merited the approbation of the Society at the exhibitions of 1863, 1864, and 1865. Before distributing the medals, he would say a word or two on the Society itself, which had now existed for a considerable period, and had faithfully recorded the progress of the art and science of photography, had been much encouraged by the public at large, and was now in a very flourishing condition. It had been observed by more than one writer of late that the period of the last seventy or eighty years had been one of the most remarkable since the world began. The events of a public and national character which had been crowded into the time since the French revolution took a most influential position in the history of the human race. He remembered the beginning of the French revolution, and the European war which took place in consequence; how France changed from a monarchy into a republic, and then again into an empire. He remembered how the emperor was compelled to retire to Elba, which he left in a small boat one dark night, landed at Cannes, then marched on to Paris, and entered the Tuileries without firing a gun. There he found the snuff-box which Louis XVIII. left behind, from which he took a pinch, and expressed much satisfaction at its quality. The fact, he thought, showed clearly how the love of military glory, of proficiency in the arts for the destruction of human life, had a greater hold upon the hearts of men than love of peace and peaceful arts. He remembered other events—the reform in this country, the changes in South America, the events in the United States, especially that gigantic civil war, which exceeded in the destruction of life and property any previous devastation which ever fell upon the human race. He had also seen revolutions in the arts, sciences, and manufactures of this country. Photography, the electric telegraph, and steam were the great monuments of the extent of the genius and industry of man during the last seventy or eighty years. In some respects, commercially speaking, perhaps steam was the most important of the three, bringing men together by the aid of steamboats and railways. The conveyance of messages with the speed of lightning was also a boon of extraordinary value; but photography, he thought, came most home to the sympathies and feelings of mankind. Steam brought England, in effect, within the limits of one county; for in olden times it took three days to go from London to Oxford, Uxbridge being the extent of the first day's journey. Now it is possible to run the whole distance from the North of Scotland to Land's End in twenty-four hours. In the same way the effect of the electric telegraph is to bring the whole world within the space of a very small county in England, because all parts of the world almost can now communicate as quickly as a message in olden times would take to go from Hampton Court to London. It carries out the wish which a lover once expressed by the poet—

> "Ye Gods, annihilate both time and space,
> And make two lovers happy!"

Photography did more than this. It gave even the humblest class the power of recording the features of those they love. It satisfied the affections of people. The potentate can record by photography his features every day if he likes, but the poor were privileged by photography, and were enabled to preserve at all times the features of fathers, sons, mothers, daughters, or of any of those dear to them. It also had the advantage of somewhat annihilating space, for it is possible to reproduce the image of all that is grand in the world, all that is beautiful; it reproduces the marbles of Rome, the paintings of Florence and Vienna and Dresden; in short, everything beautiful in art and in nature in the whole world. As he had said before, commercially, perhaps, the other two great discoveries were the greatest, but he did not think that what was best for commerce was necessarily good for the world; and regarding its effect on the hearts and affections of mankind, he would declare his belief that during the last twenty or thirty years photography had done most good to the human race. He hoped that its votaries would go deeper into the pursuit, and show an ever-increasing minute acquaintance with the secrets of nature. He was pleased to see several pictures by Mr. Swan's process on the table, a process by which the permanent substance, carbon, is substituted for the fading silver forming the image in nearly all photographs. He would refer to another of the most remarkable observations of the sun, taken by the aid of photography by Mr. Warren De la Rue, for which the French Institute had given him their gold medal. He discovered the true character of the red appearances during a total eclipse, which nobody before understood, for the eye of man was literally "blasted by excess of light;" but the eye of photography could see, and record what it saw; and astronomers had been thus enabled to determine the true nature of the red protuberances on the body of the sun. In concluding his eloquent address, the President remarked that it was a great relief to his mind when he relinquished the position of an advocate for that of a judge, so that, instead of trying to make a jury believe that the plaintiff or defendant was right or wrong, he had simply to find out the truth. And he felt it still greater relief, now that he had left the bench, that he had no longer to consider the questions at issue between A. and B., in which he had no interest, to feel that he could devote himself to the study of abstract truth, and the pursuit of philosophy, to search out and learn as much as can be known of the secrets of nature, and, having found the truth, to adopt it and cherish it. He hoped henceforth to do what he was not able to do whilst on the bench, to attend more regularly at the meetings of the Society, and give it his best aid and interest.

The President concluded an address frequently interupted by applause and loud cheering, and proceeded to distribute the medals, accompanying the presentation of each by some appropriate remarks. He called upon the medallists in the following order:—

Mr. Roger Fenton received the first medal, as the founder of the Society.

Lady Hawarden's name was mentioned next, as having two medals due. The Secretary referred to the unhappy early death of this gifted lady, and read a letter from Viscount Hawarden, saying how the medals would be prized by the family of the deceased lady. After a few touching remarks by the President, mentioning his personal knowledge of the various members of the family, whom he mentioned with eulogy,

M. Francis Bedford was called to receive two medals, for landscape photography.

Mr. H. P. Robinson received two medals, for composition photography.

Mr. Thurston Thompson being out of England, the Secretary took charge of a medal for him, for reproductions.

Col. Stuart Wortley was called to receive a medal for instantaneous photography, but was not present.

Mr. Claudet received a medal for portraiture, the President adding especial encomium as to universal recognition accorded his position as the earliest to give popularity and domestic value to the new art.

Mr. T. R. Williams received a medal for portrait photography, the President recording his personal indebtedness to Mr. Williams for the successful exercise of his art.

Mr. F. Joubert received a medal for portraiture.

Major Gresley was absent through illness; the Secretary received a medal for him.

Mr. Toovey received a medal for photo-lithography through a friend, who expressed Mr. Toovey's high appreciation of the compliment.

Dr. Maddox, for enlarged photographs of microscopic objects, received his medal through Mr. How.

Mr. England received a medal for landscape photographs.

Mr. Buxton for Eastern photographs, Mr. McFarlane for Indian photographs, and Mr. Mudd for dry plate landscapes; each had a medal awarded, but was not present to receive it.

The delivery of medals was, in each case, greeted with applause, in some instances loud and prolonged, expressing the high public appreciation of the worthiness of the award. The President, in conclusion, hoped that the distribution would give general satisfaction, and would encourage others to aid in advancing the art and science of photography.

Mr. Fenton said he thought he ought to say a few words of thanks on behalf of the medallists generally, and especially of thanks for the honour he had received and for the appreciation of the members of the Society, glancing briefly at the early history of the Society, when they had the presidency of the first representative of art in this country; when he retired, they were fortunate enough to secure the services of their present esteemed President, and he wished personally to tender to him his thanks for the kindness, energy, and zeal with which he had constantly presided over their meetings.

Mr. Dallmeyer then read a paper on a New Form of Portrait Lens, which, whilst possessing all the good qualities of the ordinary form, giving the most perfect definition, freedom from distortion, &c., &c., could, at the will of the operator, be made to yield any desired amount of depth of focus. This was effected by the use of a new form of back combination, separation of the component parts of which, by unscrewing, gave depth of focus in any degree, and quite under control. The paper was illustrated by diagrams and specimens.

MR. DEBENHAM said, he believed sharp definition in a picture depended upon every point in the object being represented by a point in the photograph. This was effected if the sensitive surface were placed at the point where the rays crossed, forming the circle of least confusion. If the sensitive surface were placed in any position in front or behind this, the point would be represented by a circle, and so produce imperfect definition. This being the case, it appeared to him that whilst an imperfectly corrected lens would not be so sharp as the perfectly corrected one in its most perfect focus, it would be at all planes in front and behind that focus no better than the perfectly corrected lens, and that no advantage in the shape of distribution of definition would be gained.

The REV. J. B. READE asked what was the diameter of the circle of confusion in Mr. Dallmeyer's new lens.

MR. DALLMEYER said that could be modified at pleasure.

MR. READE wished to know its largest diameter.

MR. DALLMEYER said, it subtended an angle of about a minute, which for a lens of ten inches focus was about the hundredth part of an inch.

MR. READE said he did not see then any great difference in result between the new method proposed by means of a lens and Mr. Claudet's plan. In moving the focus during exposure, the amount of alteration in size of image would not be more than the 300th part of an inch, which would soften without injuring definition. Looking round amongst the members, he felt sure that if the nose—say of any one of them—were enlarged to the extent of the 300th part of an inch, the result would not be perceptible; and admirable as no doubt this lens was, its results appeared to him to be the same as that effected by Mr. Claudet's movement. There was another point. Mr. Dallmeyer said that the definition ought to be better in one plane—that of the eyes—than in any other portion of the head. He did not think that this idea would be borne out by facts. In a landscape it was perfectly true that the foreground should be sharply defined, and the definition gradually become softened in the distance. This effect was seen in nature as the result of atmosphere, and was produced in a painting by what was called scumbling. A landscape with a perfectly equalized definition would be very offensive, but this was not the case with the human head. Looking in the face of a friend, he saw all parts equally defined at the same time, and by Mr. Claudet's method this equality of definition was secured. He could not but come to the conclusion, therefore, that although it would be desirable to use this magnificent instrument which Mr. Dallmeyer had introduced to them, they ought to supplement its advantages by the moving plan suggested by Mr. Claudet. By this means, he believed, they would secure the best possible results in portraiture.

MR. SEBASTIAN DAVIS suggested, as the discussion promised to be a very interesting and important one, and the hour was now late, it would be desirable to adjourn the discussion to the next meeting. The motion having been seconded,

MR. JABEZ HUGHES rose and said, that while this adjournment was very desirable, it occurred to him that Mr. Dallmeyer would suffer through it. The statement of Mr Reade, made in entire misconception of the facts, would be reported, and go forth without the correction which must necessarily follow in the prosecution of the debate.

The PRESIDENT said that it was the rule in all cases of adjournment, even in the highest deliberative assemblages in the land, that the matter when adjourned must stand over with all its imperfections on its head. This was inevitable, and simply involved regard on the part of all concerned to an important piece of advice, namely,—wait for the end.

The adjournment was then carried, and after calling attention to various specimens on the table, consisting of carbon prints by Mr. Swan, royal cabinet portraits by Mr. Downey, landscapes by Mr. Stephen Thompson and by Mr. Fox, portraits by Southwell Brothers, exhibited by Mr. Ross, photolithographs by Mr. Toovey, photo-micrographs by Dr. Maddox, and various other specimens, the proceedings terminated.

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Correspondence.

M. CHAMBAY'S COLOURED PHOTOGRAPHS.

SIR,—I hope you will, in common fairness, permit me, through your Journal, to answer some remarks which appeared in its issue of December 7th, having for source the unfortunate allusion of the *Morning Post* in regard to my system of photography, which produced the injurious effect to prejudice not only you, but all who read it. Although you had the kindness to exonerate me on the "natural colour question," still a misunderstanding is left, which I hope the following explanation will entirely erase. Your remarks run thus:—"English photographers will shortly see M. Chambay's pictures, when it will be interesting to ascertain whether they are a decided novelty, or simply a revival of some of the old methods of colouring the portrait behind."

Allow me to state that the colouring is a system which I claim as my own, and which, I believe, in its mode of application, differs from all methods hitherto known.

As to the allusion of the photograph being made transparent by the aid of wax or varnish, let me *assure* you that I am not employing either wax or varnish of any description whatever, on account of their instability, for I do not believe there is a varnish in existence which would not in the space of three months' time (if it could be used in the same manner as I employ my ingredients) turn the best photograph yellow, if exposed to the sun.

I am aware that such processes as those which you have been pleased to call similar to mine are in existence; but I beg to be perfectly understood on this point, that my process is entirely my own, without anything borrowed from any process which may be termed similar. I have devoted two years in trying the stability of different ingredients, but found none until I encountered those which I now use. My portraits have had the most severe trials under a tropical sun, gas, and humidity, but withstood the trial without the slightest change. As proof of this assertion, I shall be happy to forward you a certificate from a *responsible Government chemist* in Mauritius.

I think you will agree with me that a portrait which fades or turns yellow in a few months is worse than useless. Of what value would, for instance, the ordinary card process be, if such were the case?

You admitted that the result was "pretty and effective," and resembled those produced by the methods indicated. A small resemblance there may be; but the only means of proving the difference is by comparison.

And let me, in conclusion, remark that, *supposing* I had even copied some *unstable, thrown away, old process*, and succeeded in making it permanent, and, in consequence, valuable, ought I not to be entitled to merit for so doing? It seems to me that it should be your pleasure to receive such an improvement with open arms, and herald it forth as a public benefit, which I hope it will in short time prove.—I remain, sir, your obedient servant, M. CHAMBAY.

Paris, December 10th, 1866.

[If M. Chambay has discovered a method of giving increased permanency to photographs by his method of colouring, he has done good service to the art, no matter whether his process be entirely new, or a modification or improvement of some old process. The method is of little importance, if the result be good. We can assure him that we shall greet with approval and welcome any improvement which adds to the beauty and increases the stability of photographs, whencesoever it may come.—ED.]

YOUNG'S WASHING MACHINE.

SIR,—Your correspondent, "Photor.," in last week's NEWS, asks several questions as to the cost, working, &c., of the washing machine referred to by me in your publication of the 16th ult. I will, with your permission, give him all the information in my power.

The price of half-inch india-rubber piping is 4d. to 6d. per foot; inch piping, 8d. to Is.

I am sorry I cannot refer him to a plumber in his vicinity who will make the vessel for the price quoted; but I have no doubt there is a tradesman of the description within his reach who will undertake to do so.

"Photor." can very easily determine for himself the quantity of water required to wash a batch of prints in any size of machine that may suit him.

Take a funnel, the diameter of the escape end being (say) half an inch (if less or more, the proportion may be easily calculated); pour a gallon of water into the funnel, and ascertain the time taken till it escapes (again say that this is half a minute). A vessel, therefore, made to hold 10 gallons will fill in five minutes, and commence to empty; but, whilst emptying itself, 7½ gallons more will be supplied to the vessel. It will, therefore, take 17½ gallons for *one* water, which is filled and emptied in 8¾ minutes. Say, again, that *ten* waters will be sufficient to wash a batch of prints, we then know that we require 175 gallons in our reservoir, which will be emptied, and our prints washed, in 1 hour 27½ minutes.

Should "Photor." think that the labour of carrying this quantity of water to his reservoir will be too much for him, he may make half or almost any quantity serve, by reducing the height of the syphon.

I also observe that both Mr. Gillo and Mr. Barroclough have had to adopt a plan to tilt the machine when ready to be emptied.

This difficulty will be best met by giving a little more pressure of water, or by flattening the syphon at the bend till it is found to act. An india-rubber syphon could be most easily adjusted.—I am, sir, your obedient servant,

Southampton, 5th December, 1866. J. M. Young.

TRIPLET LENSES—FOCUSSING, ETC.

Sir,—Will you kindly permit me to add a few remarks to the observations you made last week on a letter from "Sutor Ultra Crepidam," of Cape Town, complaining of a triplet sent out to him by a "maker of considerable repute." I have worked during the last three seasons with a triplet of eight-inch focus, stated in the maker's catalogue to cover 8 by 4½ inches, but never expected to get good definition at the edges of a picture in which a stone wall stretches across the whole length of it, while using a stop 7-16 aperture. I fear photographers sometimes expect too much from the optician. No lens yet constructed gives the same definition at the edges as in the centre of a picture, except by the use of a small stop.

If "Sutor Ultra" will be content to use the No. 1 or No. 2 stop of his triplet, and focus *one-third from the centre of the view*, he will, no doubt, confess to a decided improvement in his pictures.

But while I thus dissent from the remarks of "Sutor Ultra" respecting lenses, I think his complaint of bad treatment on the part of English dealers is not altogether unfounded. Writing as a country photographer, there is some reason to complain that dealers do not manifest that fairness and courtesy that should be expected of them. To receive cutting shapes, mounts, and even cameras, contrary to order is a great injustice. If the articles are not in stock, the cash should be returned; instead of which a useless article is sent, or the cash is "placed to the credit" of the unfortunate photographer. Such has been my experience very frequently during the last few years.—I am, yours faithfully, H. C.

Northampton, December 5th, 1866.

COLONIAL PHOTOGRAPHERS AND LONDON DEALERS.

Sir,—I should like to say a word to your Correspondent, "Sutor Ultra Crepidam," in justification of the dealers in England. (In passing, I might say, it is not an order I have had anything to do with, so I may speak without bias.) Although I cannot in any way account for any respectable man sending out such things as named by your Correspondent, yet I do know, from ten years' experience in shipping photographic goods, that there are the most stupid blunders made in executing photographic orders, not by the dealers, but by those whom the orders are frequently transmitted to, viz., merchants, agents, friends, &c. For instance, I often have orders from merchants or wholesale houses which I cannot make out. I see the parties. Perhaps it is a mistake with clerk's copy, or they can't give any more sense or explanation, and I am told to execute the order as it stands, or omit. Or, if any article is ordered which is not to be had, and I explain that an improved article is now used, and may I not send that? the answer invariably is, "Send nothing but what is ordered." What should you think of an order like this: "Binocular camera, with *a lens* for stereo pictures"? Of course, I say it is an error in writing—that it means a pair—but am told only to send one lens, to adhere strictly to the order.

I have before me an order.

"Photographic camera for half-plates, with a stereo lens for instantaneous pictures." This was to be a sliding-body camera, which must have closed to three inches, so the camera could not have been used for any other purpose; and what was the use of a half-plate camera for a lens that only covers quarter-plate? There was no doubt the person ordering meant a quarter-plate camera, but, as usual, it was omitted, other articles sent, and when the photographer gets his case of goods, he will use hard language against the "fools" on this side of the water.

Again, a man orders a certain No. of Rive paper that has been used up for twelve or eighteen months. I at once inform the house here that that No. can't be had, but another No., equally good, can be sent; but the same reply, "Omit." I try to explain that the photographer can't get on without paper; he has collodion, glass, thousands of carte mounts, &c., but no paper. "That is no business of ours; adhere to the order, or omit." Can you, therefore, be surprised that photographers complain when their orders are entrusted to such *machines*—you can't call them men—and would beg of you to inform your correspondents, who may complain, that the dealers are not so much at fault as their agents.

In conclusion, I should say that in every instance quoted above, if the orders had been left to my discretion, I should have executed them in a manner that I have no doubt would have satisfied the photographers that there was some one in England that had a *little sense*.—Yours truly,

36, *Jewin Street, City, December 5th*, 1866. C. E. Elliott.

PICTORIAL TOOLS *v.* SHARP LENSES.

Sir,—Having read with pleasure your able article on this subject, I wish to say that for several months I have constantly used one of the new portrait triplets in the production of whole-plate portraits. I send you a few of the pictures, in order that you may judge of the results.

I can only plead, as an excuse for troubling you, an earnest desire for the advancement of the art-science of photography.—I am, sir, yours faithfully,

Wrexham, December 4th, 1866. B. J. Edwards.

[The examples enclosed are soft, round, and well modelled; without harsh lines, but not deficient in the delicate suggestion of texture. We hope to see more of the qualities in portraiture of which these are fine illustrations. —Ed.

PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Sir,—The case of Lloyds *v.* Ashford has possibly escaped your attention; but the decision last week can hardly fail to interest your Correspondent "Detector,"* who was in such ecstacies about an expression of opinion by V. C. Kindersley, which he thought favourable to his cause. I then warned him that he had better wait till that opinion was invested with legal authority; and although ultimately decided by V. C. Malins, there cannot be much doubt but that the *law* will not tolerate an evasion of the statute by the accidental or surreptitious acquirement of proofs without a publication line; there may be a doubt of the validity of copyright if the publisher *sells* his early proofs without the protection of the publication line; but the imposition of costs to the tune of £700 or £800 must be a heavy blow and great discouragement to the little game which has now so long been carried on by certain photographers whose views of property are very obtuse; and I think photographic copyists ought to have it brought particularly under their notice that they can no longer pursue their piratical schemes with impunity.—I am, sir, your very obedient servant,

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* "Detector's" letters are to be found in the early numbers of the Photographic News for the year 1865.

J. S. W.

[A notice of the case will be found in another column; it was left out last week from press of matter.—Ed.]

COLOURING PHOTO-RELIEF PRINTS.

Sir,—I feel compelled to trouble you for space in the next issue of the News, so that I may clear myself from the imputation of having appropriated and patented the suggestion of my esteemed friend, Mr. Walter Bentley Woodbury. I most emphatically deny the imputation, and will, as briefly as possible, narrate the origin and growth of my idea of applying colour to the photo-relievo pictures.

About the beginning of March, whilst Mr. Walter Woodbury resided at Worcester Park, London, my assistant, Mr. David Winstanley, who was busily engaged producing transparencies on glass, showed me various effects produced by placing different coloured papers underneath them; he remarking that green coloured papers produced a moonlight effect; yellow, daylight; and so on. Whilst watching him produce these changes, I suddenly thought of chromo-lithogrophy being made available in giving to these photo-relievo prints the effect of natural colours. I instantly tore out of my pocket-book a small piece of blotting-paper of a red colour, which gave the picture then under review (a ruin) the effect of sunset shining through one of the oriel windows. I then placed a piece of light brown under the masonry shades, and it gave the beautiful appearance of stone-work. Subsequently, gum was placed on the ground and on various other places on the columns, which appeared as if it were grass and moss. These curious effects amused me a considerable time, during which my friend, W. Tudor Mabley, Esq., a patent agent, came in and saw what I was doing. He seemed as much delighted by these approaches to painting in colours as I was, and ended by conjuring me, by all means, to say nothing about it, or even to show it to anyone, until I had secured the application by a patent.

I ruminated over the matter for a day or two, but could not rest till I had seen Mr. Woodbury. Accordingly, I went to London to see him, and showed him what I had arrived at. He seemed to think very little of it; one of his main objections being, that he did not think the colours would by any means appear bright through the shadows. In short, he said all brilliant colours would be destroyed in effect. Moreover, he said the same idea had been patented many times before, and therefore could not be secured. This opinion of Mr. Woodbury's by no means satisfied me; for first I satisfied myself that the invention could be secured by patent, by competent authority; and, next, that every necessary beautiful tint of nature could be imitated to life; and I then took all the necessary steps to secure the invention by Letters Patent.

You will perhaps remember that I exhibited one of these chromo-relievo pictures, in May last, to Messrs. Blanchard, Dallmeyer, Robinson, and others, with yourself, as you all expressed your admiration of it.

Some time previous to this idea of chromo-lithography, I considered the possibility of making intact moulds of each subject, which would have a plain surface everywhere but where the colour was to be printed, each mould to be altered so as to print only where wanted. This I troubled myself with for some time, but at last gave it up as impracticable, on account of the difficulty of registering, &c., &c.

I hope you will insert this in your next, as I am unwilling to have my claims to this invention set aside, or to allow photographers to think, with your correspondent, that the patent is such that it may be disregarded. Perhaps in a court of law it will stand as well as others; at least, so I am advised.

What is most to be regretted is, that my claims to this invention should be so mingled up by your correspondent with the wonderful invention of Woodbury's photo-relievo process, that they are brought into apparent collision and apparent opposition.

Mr. Woodbury has been long associated with me, and is still uniting with me to commercialize the photo-relievo process to the utmost of his ability; and though this application of mine may be simplicity itself, yet, when fully developed, it must not be despised on that account, for the resulting picture is, in my opinion, a gem of art.—I am, dear sir, yours sincerely, Robert Howe Ashton.

Manchester, December 11th, 1866.

AGENTS AT THE PARIS EXHIBITION.

Sir,—Your able Correspondent, an "Old Photographer," in remarking upon the cost of photographers employing a private agent to look after their interests at the Paris Exhibition, comments evidently upon a circular which I have issued to many exhibitors, and considers the terms too high for photographers to avail themselves of. This may be so, and especially if they consider that £20 is the only sum by which the services named can be obtained; but allow me to explain that the circular was not drawn up for photographic exhibitors in particular, but is also intended for classes requiring a great deal more attention; such as makers of locomotives, steam ploughs, &c., &c., the unpacking of whose cases, &c., would be no light matter. If your correspondent had impartially reviewed the circular, he would have found that the following words are inserted for the benefit of those only requiring small attentions:—"I shall be open to make special agreements, as to terms, with firms requiring either less or more attention than indicated above." The first remark an exhibitor made to me on the circular was, that he should require more attention than could be afforded for £20.

I am ready to give photographers every assistance in my power, but cannot afford to spend days away from my regular business for insufficient recompense.—I am, yours respectfully, R. J. Fowler.

11, *Rue d'Enghien, Paris, December 10th*, 1866.

PARIS EXHIBITION, 1867.

Sir,—I observe from your journal that an amount of uneasiness appears to exist in the minds of photographers intending to exhibit their works in Paris, as to the arrangements for sending and dealing with their works there, especially as the circular lately sent them from the British Executive lays down regulations which, however proper for the general body of exhibitors, are scarcely applicable to the exhibitors of photographs.

I refer especially to the direction to appoint an agent to take charge of the packages as they arrive. Taking, as I do, a great interest in everything connected with photography, as well as in the success of the Exhibition generally, I have taken the opportunity of enquiring into the matter at South Kensington, and, although I have no authority to pledge that body, I have every reason to believe that a special circular will be addressed shortly to each exhibitor of photographs, pointing out the arrangements to be adopted, and laying down the course of action to be taken by them. No agents will be required, and the packages will be taken charge of and unpacked by the British Executive, and afterwards hung by them.

I would suggest that the British exhibitors of photographs should join in some combined action for sending their productions to Paris, as conducive to economy as well as safety. If such be their desire, I shall be very happy to afford them a place at which to meet and determine on their arrangements, and I think that I could probably aid them in getting their photographs packed and taken to Paris under one management, and delivered to the British Executive there, the expense being divided amongst them in proportion to the space they occupy. It might also be worthy of consideration whether the glass, and perhaps the frames, might not be supplied in Paris for use during the Exhibition at a fixed charge or rent.

These are matters for consideration; but, under any circumstances, it appears to me to be to the interest of the photographers to unite in sending their pictures to Paris, rather than each man sending his own separately.

Any help I can give (such as it is) is at the service of the exhibitors.—Yours faithfully, P. Le Neve Foster.

Society of Arts, Adelphi, W.C., 12th Dec., 1866.

Talk in the Studio.

South London Annual Dinner.—Members should not forget that the annual dinner of the South London Photographic Society will be held on Saturday evening next. Tickets to be had of Mr. How, Foster Lane.

The Medals of the Photographic Society.—The medals of the Photographic Society, distributed last Tuesday evening, were, in some respects, amongst the finest specimens of the numismatic art. The medals are massive and of silver. The obverse contains a good portrait of Prince Albert, the late President of the Society, and the reverse the chariot and steeds of Phœbus Apollo, after a picture by Bartolozzi, the designs for the medal having been produced by Mr. Durham.

Prices of Cabinet Portraits.—One of the ligitimate hopes of many portraitists has been that the introduction of a new size of popular portraiture would assist in recovering the prices from the unremunerative depth to which an unwise competition had sunk card portraits. A correspondent sends us an advertisement cut from a provincial paper, in which cabinet portraits are advertised at the same price as cards. This is surely a most suicidal policy, calculated to injure all, and do good to none; and we would earnestly impress upon photographers the folly of such a course. The system of underselling never pays in the long run in any business, and in photography it is peculiarly foolish. Instead of ensuring a large amount of custom to the photographer who first commences the ruinous game, it merely compels others to reduce their prices as well. The amount of custom is then distributed again as it was originally, with the difference that all are receiving considerably reduced prices, rendering excellence less probable. The legitimate ground of competition is to endeavour to surpass all others in quality of work, and not to enter into ruinous race of reduction in price.

The Artist not Dependent on Material.—An article referring to art criticism in a daily contemporary has some good remarks, which might with propriety be remembered in the discussions on the art claims of photography. It does *not* matter on what material an artist works,; if he succeed, he produces a work of art; if he fail, the material will add no value to his failure. We quote the passage:—"The material employed has, however, little interest for the critic, whose aim is to discover effects rather than to describe the means by which they are produced. If the painter fails to realise the happy effects of nature, it can hardly matter in what medium he failed; and if he succeeds in his high aim to interpret the beauties of form, and passion, and sentiment, or deals successfully with out-door subjects of land and sky, and charms of forest and mountain, the only concern would be that the pigments employed should possess the quality of permanence."

To Correspondents.

W. W.—A whole-plate combination is not suited to the production on ten by eight plates of copies of pictures. Probably the front lens of the combination alone, reversed and used as a landscape lens, may answer your purpose. Place the picture in a position where it will receive a strong diffused light, and use the ordinary wet collodion process, giving plenty of exposure.

T. L.—A toning bath of acetate of soda and chloride of gold should be made 48 hours before use, and may then be used for weeks, sometimes for months, without any attention, except the addition of a few drops, now and then, of concentrated chloride of gold solution, adding one grain of chloride of gold for every two or three sheets of paper toned: or sometimes adding fresh toning bath, made as at first, but in a less dilute condition. If the bath get out of order and refuse to tone, make a new one. There is no need to use chalk unless the sample of chloride of gold be decidedly acid. Either the double chloride of gold and sodium, or the double chloride of gold and calcium, will answer well.

Blondin.—There are two modes of disposing of second-hand apparatus: either offering them to a second-hand dealer in such things (whose addresses will be found in the advertising columns), or advertising the articles for sale, at a given price, in the columns of the News.

R. R. Taylor.—Chloride of silver is not soluble in nitric acid. If you have no facilities for reducing it to metal in the crucible yourself, the best plan is to trust it to a refiner. 2. The most efficient method of removing rust from the steel plate of your rolling-press is to use rottenstone and oil; but if deeply rusted, its true surface will be gone. Such a plate, when not in use, should be coated with wax, to protect it from the damp atmosphere. 3. Pictorial backgrounds, to be of any value, should be varied. We should be very sorry indeed, if no other difficulty were in the way, to furnish designs which would encourage uniformity of result amongst many thousands of photographers, instead of promoting variety and originality, both of which are desirable.

A Correspondent, with an illegible signature, asks what he is to do with a second-hand lens, which will not cover a picture of the size for which he purchased it. We really cannot tell him. He could scarcely hope to purchase for two pounds a lens stated to be worth seven pounds; and we do not know any lens, the price of which is not more than seven pounds, which is well suited for cabinet portraiture. His best plan, if not satisfied, will be to endeavour to induce the dealer to exchange the lens for some other that suits him better; and he must not be disappointed if, in expending two pounds, he only gets two pounds' worth. 2. The fog at the bottom of his plates may be due to light entering his camera, or to a variety of other causes.

C. C. is informed that all the works of Mr. H. P. Robinson may be procured of that gentleman, at his residence, 68, Canonbury Park South, N., and some of his more recent ones of Marion and Co., Soho Square.

An Eight Years' Subscriber.—Thanks.

E. N.—The lens you have selected will answer well for card vignettes. 2. The best position for the stop is about one-fifth of the focal length of the lens; but in using a lens of 4½ inches focus for stereoscopic pictures, it will often be desirable, in order to increase the field of illumination, to use the stops a little nearer; the effect of this will be to reduce slightly the curvature of lines, but the marginal definition will suffer slightly, and the curvature of the field will be greater. It is probable that in a lens of the construction you describe, these defects will be minimised. The lenses chiefly used by Mr. Wilson are single lenses of six inches focus by the maker you name. 3. For 7½ by 4½ pictures the wide-angle single lens by the same maker, of seven inches focus, will answer your purpose.

Peter Griffiths.—The possibility of reviving the image in your Daguerreotype portrait depends entirely upon circumstances. If it have been erased by rubbing, as you seem to indicate, there are no means of restoring it. If, however, it be merely hid by blue or brown film, arising from atmospheric action on the metallic surface, the evil may be remedied. Remove the glass, wash the picture with distilled water until it flows freely, then apply a twenty-grain solution of cyanide of potassium until the tarnish is removed; then rinse thoroughly with distilled water, and dry by heat.

J. B. B.—Non-actinic glass can be obtained of Claudet and Houghton, Holborn.

A. J.—The case is very curious. The only certain remedy is a change of collodion.

J. Phillips.—A varnish composed of Canada balsam, diluted with turpentine, is sometimes used. The ordinary megilp used in oil painting may also be used. The ordinary oil colours supplied by artists' colourmen are employed for the purpose, taking care, however, to select transparent pigments. If you state your object to the artists' colourman, he will doubtless supply you with the proper materials.

A Learner.—Negatives should not be placed in a strong and hot solution of washing soda, as such a preparation, besides removing the varnish, will often injure the surface of the glass, which renders it unfit for subsequent use. The change effected is the removal of the layer of ferrid-cyanide of silver, to which the red colour was due. 2. If the slight fog mentioned is due to want of acid, add a little nitric acid to the bath. 3. In toning a small number of prints in a small quantity of solution, it is unimportant if you use a large dish or a small one, so long as you take care to keep the prints perfectly immersed, and to prevent them sticking together. 4. Same answer as last. 5. The best method of precipitating silver in old hypo is by means of sulphide of potassium. The black precipitate, caused by sulphuric acid, is sulphide of silver; it should be reduced in a crucible to a metallic form before it can be again made into nitrate of silver. 6. Negatives should not be sent by post at all, except in a box or case, in which case letter rate will be charged for them. 7. There is much room for improvement.

A Military Amateur.—We regret that we cannot furnish you with the name of such a manufacturer as you require. There is generally some difficulty in inducing capable manufacturers to undertake such little tasks. They do regard it as conferring a favour; probably it really is so, as it is generally undertaking a duty out of the regular routine, in the execution of which a result is obtained apparently inadequate to its cost.

International Exhibition of 1867.—We refer several correspondents writing on this subject, and on the proposed combination among photographers, to the information on the first page of our present number.

Erratum.—In the article on Emptying Large Dishes, p. 581 of our last, last line, for "22 wide and 23½ deep," read, "22 wide and 3½ deep."

A. W. Haamer.—Thanks. We shall be glad to receive an account of the experiments to which you refer when they are completed.

Caate.—Thanks. Picture enclosed is very good indeed.

C. Taylor.—There is no reason why you should not float the paper on the silver solution if you wish it. It will not spoil the bath. The chief fault so far as we can judge from the example sent, is due to the action of light on the paper besides that which passes through the negative. The sensitive paper is not sufficiently guarded from light whilst exciting or developing, and this causes the discoloured. The sensitive paper should be as zealously guarded from light as a collodion plate.

Stereo.—We believe that Mr. Wilson uses 7 by 4½ plates for his stereo pictures, and, of course, uses two lenses. 2. Two lenses are, undoubtedly, best for the purpose. Your landscape with figures is very good. Thanks.

Some reviews and articles in type are compelled to stand over until our next.

Several Correspondents in our next.

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THE PHOTOGRAPHIC NEWS.

Vol. X. No. 433.—*December* 21, 1866.

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THE INTERNATIONAL EXHIBITION OF 1867.

An opportunity for the combination which we have urged upon photographers, to facilitate arrangements for the Exhibition, now occurs. The courteous offer of Mr. Peter Le Neve Foster in our last affords facility for immediate and definite action. We need only call attention to the following communication, which we have just received from Mr. Foster, and leave the matter in the hands of those concerned, merely remarking that prompt and decided action is now required, as the time does not admit of delay. The following is the letter to which we refer :—

"In consequence of the inapplicability, to photographs, of the general regulations issued by the Commissioners of the forthcoming International Exhibition in Paris, it is feared that many photographers who have obtained space for their contributions will be deterred from forwarding them. Thus British photography may be nearly unrepresented there. With a little unity of action among exhibitors themselves, it is hoped, all difficulties connected with packing, transmission, reception at the Exhibition, &c., in Paris, will be in a great measure removed. To secure this desirable object, the undersigned invite their fellow exhibitors to join them at a meeting to be held on Thursday, the 27th inst., at seven o'clock p.m., in the rooms of the 'Society of Arts,' Adelphi, W.C., which have been placed at their disposal for the purpose through the kindness of the Secretary.

"F. Bedford. "H. P. Robinson.
"W. England. "J. Mayall."
"W. E. Debenham.

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THE DIFFUSION OF FOCUS CONTROVERSY.

The discussion as to the best means of securing diffusion or depth of definition revived at the last meeting of the Photographic Society, by the reading of Mr. Dallmeyer's paper, was suddenly cut short by the adjournment rendered necessary by the lateness of the hour. The subject will be renewed at the next meeting of the Society, to be held in January. There does not, however, appear to be much more to be said on the subject.

The next important phase of the discussion should assume an experimental form, and issue in results. Photographers generally seem to be satisfied that diffusion of focus is in many cases desirable; and, being desirable, it is now within their reach. Everybody can try Mr. Claudet's plan with the lenses he already possesses. Those who desire the more perfect optical facilities can obtain the wonderfully comprehensive lens Mr. Dallmeyer describes. But in any case, the question must eventually be decided by practice.

The power now placed in the hands of photographers is, as Mr. Williams phrases it, something that many of them have dreamed of, but have not dared to hope to realize. The possibility of possessing a portrait lens which, without sacrifice of rapidity in action or of any point of excellence in result, should permit the most microscopic definition to be secured when desired, and at the same time admit of variation in a moment into any degree of softness and diffusion of definition which the nature of the subject or the wish of the operator might render desirable, might naturally have been regarded as hopeless indeed. The confessedly weak point of a lens constructed to give a certain amount of diffusion of focus is the fact that the amount of definition sufficient to render, with sufficient softness and sufficient detail, the contour and texture of a head on a large scale, would be altogether inadequate to render properly the same head on a smaller scale. The definition which would satisfy the eye in a large head would be hopelessly fuzzy in card pictures. To meet every requirement with such lenses the portraitist would have needed to possess, as Mr. Hughes suggested, a lens-chest, furnished not only with lenses for every especial branch of work, but for every size of portraiture. If this had been necessary to excellence, it ought, however costly, to have been done; but, with the new lens, all this is rendered unnecessary. The card lens which, screwed home, will give the sharpest possible results for the smallest image, will, with one or two turns of the screw, give the soft diffused definition necessary for producing a bust portrait or vignette head on the same plate. In short, it appears to inaugurate a new era in portraiture. As a writer in the *Society's Journal* remarks, Mr. Dallmeyer, in this lens, appears to have effected as much for pictorial photography and artistic portraiture as Petzval, in the construction of the portrait lens, effected for photographic portraiture itself. Even in the days when sharpness was a *sine qua non*, and perfect correction considered imperative, it should not be forgotten that Petzval himself recognized the fact that unnecessary sharpness in one place at the expense of others was a defect. When a pupil exclaimed, with delight, on examining an experimental result, that it was sharp enough to bear magnifying a hundred times, "That is a defect," returned Petzval; "such an amount of sharpness is unnecessary, and some of it must be spared to improve the marginal definition." Unfortunately, his attention appears to have been given only to the distribution of definition as evenly as possible over one plane, without considering the importance, in delineating solid bodies, of distributing it over many planes.

On the subject of sharp or soft definition it may not be uninteresting to hear the opinion of Sir Joshua Reynolds. In his criticism of the works of Vanderwerf, given in his "Journey through Flanders and Holland," he says:—"There is, in nature, a certain proportion of bluntness and sharpness: in the medium between those two extremes the true and perfect art of imitating consists. If the sharp predominate, it gives a dry manner; if the blunt predominate, it makes a manner equally removed from nature; it gives what painters call woolliness and heaviness, or that kind of hardness which is found in those pictures of Vanderwerf."

In the extract just made, the photographer will find a suggestion of the value of the new power placed in his hands, and of the importance of judgment in using it. His work may be as sharp or as blunt as he may please, but excess in either direction, in a degree unsuited to his subject, will be an imperfection.

It is scarcely worth while to refer to the fragment of a discussion which occurred at the meeting of the Society. Only two speakers had opportunity of entering on the subject, and both laboured under misconceptions. Mr. Debenham imagined that the definition given by a perfectly corrected lens in the planes remotest from the focus would be quite as good as those in an imperfectly corrected lens, the only difference being, that in the first there would be sharpness in one plane, and in the latter sharpness in no plane. A glance at the diagrams on another page will dispel this notion, or it may be dispelled better still by absolute trial. The Rev. Mr. Reade entered on a subject not then before the meeting, but mentioned during prior discussion. At a former meeting Mr. Dallmeyer said that whilst diffusion of definition was desirable, absolute equalization of definition was not so. Some planes—that of the eye, for instance—were more important than the rest. This Mr. Reade combated, alleging that every part of the head was seen in nature with equal distinctness at once, and all parts should be rendered with equal sharpness. That all parts are seen with equal distinctness at once is, we submit, a manifest error. The human eye, having a small aperture, has considerable depth of focus, and possibly there is little difference in the sharpness with which it defines the various parts of a head at even a few feet distance; nevertheless, there is an absolute change of focus when the attention is directed from the nose to the back of the head. A better objection than Mr. Reade's might be found in the fact that in having one plane (that of the eye) better defined than the rest, the cheek with wrinkles and freckles would also be better defined. In answer to this it should be borne in mind that, with optical diffusion of focus, it is not intended that any plane shall be so defined as to give microscopic sharpness. Some artists—Sir Thomas Lawrence, for instance—give a few sharp touches to the eyes, whilst in all the other portions of the head sharpness is especially avoided. This cannot be done with the same facility by the lens, it is true, but something analogous can be effected by giving a little superiority of definition to this plane.

As we said, however, at the outset, the most important elements of the discussion in future will consist in practice, and in comparison of the results of practice, and to this form of the controversy we direct the attention of photographers. We do not imagine that much more light will be thrown on the subject by further talking.

For our own part, we contemplate the present aspect of the question with much satisfaction. Years ago, when it appeared almost hopeless to anticipate a change, we dwelt on the importance of this quality of soft and diffused definition and on the importance of regarding a portrait lens as a pictorial tool. We can now congratulate photographers on two facts in connection with the subject: first, that amongst the best men in photography, soft and diffused definition is considered desirable; next, on their possession of means to secure this diffusion and an optical control over their results, until to-day impossible in photography.

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ANNUAL DINNER OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The Annual Dinner of the South London Photographic Society was held at the "Salutation Tavern" on Saturday evening last, when about thirty gentlemen sat down to an admirable dinner, the Rev. F. F. Statham, M.A., in the chair, and Mr. Sebastian Davis in the vice-chair. The proceedings of a social meeting of this kind are generally recognized as not for publication: were it otherwise, we should have to record details of one of the most interesting photographic meetings we have attended for a long time. Eloquent speeches, sparkling wit, and excellent music amply filled up the time. Glees and part songs, by a choir of the members, formed an interesting feature of the evening. Two original comic songs, the subjects of which were altogether photographic, were sung by the writers during the evening. Besides the usual toasts, photography, art photography the South London Photographic Society, and several other special toasts, were duly honoured with eloquent speech and hearty acclamation.

We briefly notice here this pleasant form of annual social gathering as a hint for other societies, to whom we wish the enjoyment of an evening as pleasant as that spent by the members of the South London Photographic Society.

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PRINTS FROM A STEREOSCOPIC NEGATIVE NOT NEEDING TRANSPOSITION.

Mr. Ennel, a gentleman whose name some years ago used to be familiar to the members of the London Photographic Society, described at the recent meeting of the South London Society an extremely ingenious method of printing from a stereoscopic negative taken in a binocular camera, by which all need of subsequent cutting and transposition of the print was rendered unnecessary. Photographers are of course familiar with the method of printing one-half at a time, and then transposing and printing the other half, which is practised in producing transparencies from such a negative as we are speaking of. But to print both halves at once without either cutting and transposing the halves of the negative, or cutting the prints, would appear at first sight impossible. Mr. Ennel effects it, however, very simply. Proceed as follows:—

Presuming that the negative is 5¾ inches long, and the halves in their proper relation, take a piece of sensitive paper the proper width and 11½ inches long; fold each end, sensitive side outwards, so as to meet in the middle; the middle piece of the paper so folded will present one continuous surface, 5¾ inches long; the two ends will also present a surface of similar length. First, one sensitive surface is placed in contact with the negative and printed, and then the other, the whole being then toned, fixed, and washed in due course. When opened out, the length will present two complete sets, the halves of which are already in proper relation to each other, and will only need dividing in the middle to give two slides perfectly correct in their position without further division or transposition.

◆

Critical Notices.

ANNALS OF CHRIST'S HOSPITAL, from its Foundation to the Present Time, and of the Original Conventual Church of the Grey Friars. By A Blue. With Six Photographs by V. Blanchard. (London: Lothian and Co.)

There are few purposes to which photography can be put which possess so much of interest and value as that of producing mementos of something loved which is absent. Whether it be the portrait of a distant friend, or the view of a fondly-remembered scene, it is the exact reproduction of the features, with all the faults and all the beauties constituting individuality, which gives to the memento its especial value; and hence a photograph is often more prized and dearer to the affections than a painted picture, of more art value, possessing less vivid resemblance. For this reason, photography has a peculiar value in illustrating works like that before us, and will give it an interest, not without tenderness, in the eyes of the thousands who will probably read the book, and recal the happy days of boyhood spent in this noble institution.

Of the book itself it is less our province to speak. To all the extensive fraternity of "Blues" such a work would certainly be welcome, if it were merely a fair historical record of the hospital. Here we have, however, something considerably more than this: the history from the period of the foundation of the institution is very complete, as are also the details of the internal economy and management, domestic and scholastic. The reminiscences of celebrated Blues, amongst whom are Charles Lamb, Leigh Hunt, Coleridge, and others, is full of interest; and the chapter devoted to the present management, means of admission, and advantages to which the scholars have access, will interest a still wider circle than the "Blues" themselves.

The book is admirably printed and got up, and is altogether a handsome and worthy volume.

THE NEGATIVE AND THE PRINT; or, the Photographer's Guide in the Gallery and in the Field. By John Towler, M.D., &c., &c. (New York: J. H. Ladd; London: Trübner and Co.)

The indefatigable and able Editor of *Humphrey's Journal* has produced another valuable addition to the photographer's library. The "Silver Sunbeam," which has run through so many editions, contains a very complete and comprehensive, although necessarily concise statement of all facts and principles pertaining to photography. The "Photographer's Guide" is rather intended as a manual of practice, containing detailed instructions for operators in portraiture and landscape work, and all that pertains to the actual production of pictures. Dr. Towler is here, as usual, a lucid and a pleasant teacher, to whom we can with pleasure recommend our readers.

HINTS ON SPECTACLES: When to Wear, and How to Select Them. By W. Ackland, Surgeon. (London: Horne and Thornthwaite.)

The name of Mr. Ackland is well and favourably known to photographers, in especial connection with their own art. In the little pamphlet before us they will find him an equally trustworthy guide on a subject of the deepest importance to all who value their eye sight. We have an exceedingly clear and simple exposition of the whole subject, and especially of what the skilled oculist can do to remedy the various forms of imperfect vision. We commend the little pamphlet very heartily to all interested in its subject, and select the following extract, as of interest to every one, as an illustration of the lucidity of style which characterizes Mr. Ackland's mode of dealing with his subject:—

SHORT RULES FOR THE PRESERVATION OF SIGHT AND THE SELECTION OF SPECTACLES.

It is of the highest importance that near and distant objects should be equally examined, so that the eye may preserve its fullest power of adjustment. This should be done by the unaided eye alone, where it is possible, but the short-sighted should always use spectacles, as the power to see at different distances becomes paralysed, and different spectacles for near and distant objects will be required.

If the eye becomes inflamed from excessive uso, give it perfect rest, and use an eye-water composed of sulphate of zinc 3 grains, rosewater 2 ounces

Irritation and inflammation of the eyelids may be removed by their being smeared nightly with a camel's hair brush charged with an ointment made of red oxido of mercury 3 grains, spermacetti ointment 1 ounce.

Spectacles should only be worn to compensate for any deficiency or excess of refractive power of the eye, and this deficiency or excess should bo most carefully ascertained by the use of the optometer, in order to guide us as to the requisite focus needed.

The spectacle frames should be adapted to suit the face, and the centres of the lenses should be nearly the same distance apart as the width between the pupils. It must be especially borne in mind that spectacle lenses should be kept free of scratches, as the existence of any impediment to the free transmission of light interferes with vision, and irritates the eyes.

Use the softest wash-leather to wipe your spectacles, and if the lenses becomes scratched, have them exchanged at once.

In no case should spectacles be selected so as to leave the eye's adjustment nothing to do, but how much may be left for this power of the eye to accomplish must be determined by tho skilled optician, and varies in different cases.

The long-sighted should not view distant objects through spectacles intended for viewing those near at hand, or an immense injury would be done to the eye.

The short-sighted ought always to use spectacles, in order to enable them to view distant objects; but whether they should use spectacles to see near objects is a question for the optician to decide, and in each case on testing the eye; and no general rule can bo laid down. In some cases it is beneficial, and in others decidedly injurious.

Single eye-glasses are injurious, as all the work has to be done with one eye, and then a prolonged use is always followed by the focal length of the eyes differing from each.

The eye should never view an intense light.

In using artificial light, never allow any of its rays to fall on the eye, but so shade it that the light may fall freely on the book or object viewed.

Never use a flickering or unsteady light for reading or writing, and avoid being employed on black objects by artificial light, as daylight alone furnishes sufficient light for this purpose.

Those afflicted with weak sight should avoid the use of gas as much as possible, and read, write, or sew by tho more steady and soothing light of a properly-constructed reading lamp.

Never read during railway travelling, as the rotatory motion causes a strain on the eye.

Glasses of a neutral tint should be used to protect the eyes from sunlight, when weak or inflamod.

CARBON PRINTING.—No. 4.

BY NELSON K. CHERRILL.*

I have in a recent number described the method of transferring the carbon prints to silk; it remains for me now to speak of the more ordinary work of producing the picture upon paper or cardboard. My earlier attempts at transferring the picture gave me some little cause for apprehension as to the certainty of success in the operation; but I have since found out what was wrong in my work, and am now in a position to affirm that of all the operations connected with the work, this is the one most easy of performance. The prints, when dry after development, should be brushed over with a solution of clear gelatine, and then hung up to dry. I have not found that the exact strength of this solution is of any very material consequence; it must be thin enough to flow easily, and yet strong enough to ensure the print sticking well; a solution that is, when cold, just gelatinized is, I find, about right, though, as I say, there is great latitude allowable. When the print is covered with it, air-bubbles should be removed as much as possible, but a few small ones will not hurt. In the case of very large numbers of prints being done, it would, no doubt, be well to use a dish for the gelatine solution; but then this, of course, would necessitate the use of a proper arrangement of hot water to keep the solution warm. For small numbers of prints, I find a brush best for coating them with the solution—one about four inches wide, set in tin, will be found very useful for this and other operations in carbon. When the prints are quite dry they may be cut to shape, and they are then ready for mounting.

There are two ways of doing this: one, which places the picture direct upon the cardboard, and in which the cardboard itself forms the whites of the image; and the other, in which the cardboard is replaced by paper: this latter is, no doubt, the best method of working, but it involves rather more trouble. Dip a sheet of paper into water (Saxe paper does best), and take it out directly; place it for one moment between sheets of blotting-paper, till its surface, when examined by reflected light, shows just the least traces of moisture in little shining patches; then place the paper on one of the cut prints, and run them both through the rolling-machine. Care must be taken in this operation that the paper is not creased, as, if it is so, the picture will be spoiled. The back paper must not be taken off before it is quite dry, or there will be risk of tearing the film of the picture. If waterproofing is required, I find it best after the back is taken off; an immersion of half-a-minute in a saturated solution of alum will suffice. The prints should then be washed well for a little time, to get rid of the superfluous alum, and dried spontaneously. If thought well, chloride of barium may be dissolved in the mounting solution of gelatine, and then a white pigment will be made at the back of the picture when it is plunged into the alum bath. I am not quite sure if this is any improvement to the result, but the thing is worth knowing: it was, any way, a very clever idea of Mr. Swan to hit upon it, as it is much less trouble than the plan of using white pigment in the gelatine itself. If the transfers are required on the card itself, the method of procedure is the same in principle; the card must be wetted, and then, when the superfluous moisture has been got rid of, it must be passed, with the print in position on it, through the rolling-machine; in doing this, some little care is necessary; the print is very apt to slip (at least, so I find), unless it is well rubbed down upon the damp board; but if you stay only a minute or two, and rub the two surfaces well together, you will be almost sure to find that the gelatine has absorbed some moisture, and become more or less soft; and then the pressure of the machine will blur the image. Prints on cardboard will not, as far as I can see, bear waterproofing (at least, not in the ordinary way). I hope to be able to succeed in other ways, and if I should do so, I shall communicate the result to the News.

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* Continued from p. 532.

I will conclude this paper, and with it the series for the present, with a few general hints, derived from my experience with the tissue with which Mr. Swan has been kind enough to supply me. I take this opportunity of stating that the method of working which I have advocated throughout has been one which has given me good results, though, from my limited experience, I am by no means ready to affirm that it is the *best* method of work. All photographers will look with more interest to Mr. Swan's own instructions, which are, I believe, to be published soon.

Hints for Carbon Printing with Swan's Tissue.

No. 1.—Keep the tissue *flat* in a drawer; this renders its immersion in the bichromate bath much easier.

No. 2.—Wipe the surface of the tissue well with a cloth or roll of flannel before wetting it with the sensitizing solution.

No. 4.—Use the bichromate solution as weak as is consistent with its equal and sufficient action.

No. 5.—As the sheets become very heavy in the bath, hang them to dry over rods in preference to pins or clips; these are so apt to tear the corners.

No. 6.—Should the lower corners show an undue tendency to curl up when wet, they may be extended by fastening a strip of cardboard along the bottom of the sheet with two pins.

No. 7.—When all the tissue is dry, dust it over with French chalk, and keep it for use *rolled up*; this keeps the moisture of the air from it.

No. 8.—Should the tissue become too dry and liable to crack (this has only been the case with me once, on a very cold day, when there was a strong east wind blowing), it may be made all right again by holding it for a minute in the steam of a kettle.

No. 9.—Never omit to rub the negative with French chalk.

No. 10.—When the prints are mounted on the first paper before development, take care, in passing them through the rolling-machine, that they are not subjected to uneven pressure.

No. 11.—Use the first water for development at about 90° or 100°. Water at about 120° will be generally required to finish with; but the greater bulk of the pigment may be got off at a lower temperature.

No. 12.—Mr. Swan informs us that a large number of prints may be developed at once without any risk.*

No. 13.—When using very hot water for the development, take care that any part of the picture which may rise to the surface does not get dry, or it will stain.

No. 14.—If you should see any air-bubbles, it is best to prick them at once, to prevent their spreading.

No 15.—In hanging up pictures to dry, place them, with the darkest part of the print up at the top, near the pins.

No. 16.—When the transfers are well done, there is but little fear in tearing off the covering paper at once; but should any be found to stick, use a little benzole.

In conclusion, if you fail, "try again;" and if you make any new experiments, send an account of them to the News.

ON A NEW PORTRAIT LENS.

BY J. H. DALLMEYER.†

I have the pleasure to introduce to your notice this evening a new portrait combination, which, besides combining all the good qualities of the ordinary or Petzval portrait lens in its most perfect form, is adapted to yield at the will of the operator, by means of an easily effected mechanical adjustment, any desired amount of diffusion of focus, or distribution of definition.

The recent discussions, articles, &c., on the subject of diffusion of focus, have made it apparent that amongst the most able photographers pictorial qualities in portraiture are regarded as of more importance than microscopic definition on one plane and over a limited area.

The method of obtaining the desired amount of diffusion of focus by a movement of the lens or camera during exposure, as brought before you at the last meeting of this Society, was shown to be objectionable on many grounds. Moreover, the results so obtained and exhibited were generally pronounced inferior to those produced without the movement, by Mr. Robinson, Mr. Hughes, and others, with a lens manufactured by me, viz., a modification of my Triple Achromatic Lens, which was brought before you at the close of last year.

Now, in order to make the distinctive features of this and the last new lens more readily intelligible, I may be permitted to offer a few remarks on diffusion of focus, or what is better known as "depth of focus," generally, and the means whereby it can be obtained.

To begin with the simplest form of camera obscura, viz. a small aperture or pinhole in a window-shutter of a darkened room, with a screen placed diametrically opposite. Upon this screen is projected an inverted image of external objects, by the light coming in right lines through the small aperture. Now it will be observed that in this case we have an unlimited amount of distribution, or depth of focus; for the screen may be placed at any distance from the aperture in the window shutter, and the image remains equally well defined; or, in other words, external objects situated at all distances from the aperture in the shutter are depicted upon the screen with an equal degree of sharpness. Unfortunately, however, the image so obtained is too feeble and indistinct to be of any practical use to the photographer.

If, in order to increase the intensity or distinctness of the image, we introduce a lens in the place of the above small aperture, we at once obtain the desired qualities. But now, besides other drawbacks, it becomes necessary, in order to obtain a well-defined image of external objects, that the screen should be brought into a position coincident with the focus of the lens; or, in other words, objects situated at different distances from the lens will no longer be equally well defined on the screen. Thus, then, we purchase increased illumination and distinctness on one plane by the loss of distribution of focus over several planes.

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* My own experience has been almost entirely confined to doing a few prints—generally only two or three at once—so that I might watch the result.

† Read before the London Photographic Society, December 11th, 1866.

The amount of confusion, or want of sharpness of image, for objects situated at different distances, depends—for a lens free from spherical aberration—upon the aperture in relation to its focus. (In the following and subsequent illustrations, for the sake of simplicity, the chromatic aberration has been neglected.)

Thus, let lens A B, fig. 1, be free from spherical aberration, *i. e.*, causing the several incident rays proceeding from a distant object, as *a a*, *b b*, *c c*, to be refracted, and all to intersect the axis C at the point F, the focus; it is obvious that the marginal rays *a a* cross axis C at a greater angle than the more central one, as *c c*. Hence, any alteration of position of screen is attended by much greater confusion, or want of definition, when using the full aperture of lens A B, than when contracting the same, and only using so much of the lens as is involved in the refraction of rays *c c*.

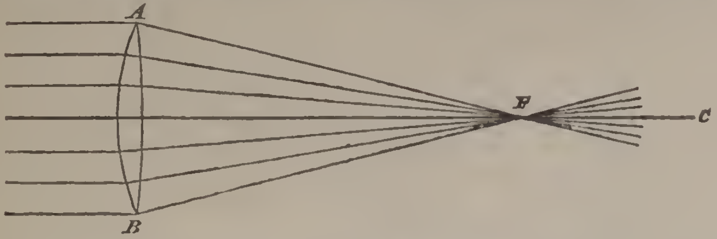

Fig. 1

Thus, then, the advantage of a smaller aperture to obtain distribution of definition is evident.

This mode, however, of obtaining diffusion of focus, as every photographer knows, involves prolonged exposure, and cannot therefore be employed to any great extent for portraiture. Besides, it is contended, and with justice, by artists generally, that portraits taken with small apertures are deficient in brilliancy, relief, &c.

The other mode of obtaining distribution of focus is illustrated by fig. 2.

Let lens C D be of the same diameter as A B, but of such form as is known to produce positive spherical aberration, *i. e.*, the several rays, *d d*, *e e*, and *f f*, instead of intersecting axis C in one point, cross it at several points, as at f_1, f_2, f_3; *i. e.*, the marginal rays cross the axis at a point nearer to the lens than do the more central ones; and thus we have, as it were, a succession of foci, or images of objects, overlapping each other. It results from this, that, by sacrificing extreme sharpness of image on one plane, the exact position of the screen is no longer so rigidly defined as in the former case; or, in other words, reversing positions of radiant and image, objects situated at different distances from the lens, within certain limits, will all appear in moderately good focus, depending, of course, upon the aperture, focal length, and amount of spherical aberration of lens C D.

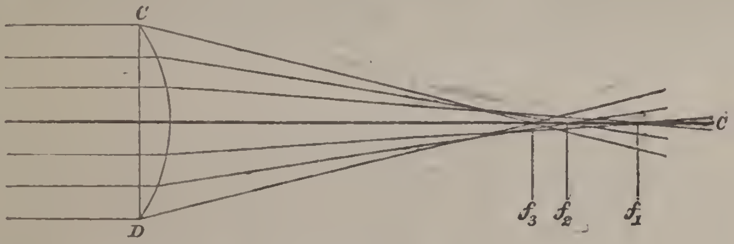

Fig. 2

Thus, then, we have a familiar illustration of the second mode whereby to obtain distribution of focus.

I was induced (I confess, after considerable pressure) to adopt this last-named method of procuring distribution of focus, and constructed, some time since, the triple portrait and group lens, already referred to, which, with the full aperture $\frac{f}{7}$, has a certain amount of spherical aberration so as to give, for a given focal length of lens, distance of object, and size of picture, parts of the figure in sufficiently good focus.

As regards the success of this instrument, I need only refer to the results exhibited at your meeting on the last occasion.

I have already stated, however, that the amount of aberration thus intentionally introduced has reference, for a given aperture and focal length of lens, to the size of image or distance of object. If these conditions are ignored—that is to say, if a lens constructed to produce a certain sized image is used for a considerably larger or smaller one—the lens in question is no longer the best possible; and hence the photographer must either have a series of lenses adapted to the several varieties of size of image, or, if possible, the instrument itself must be capable of adjustment as regards the amount of aberration it possesses, so as to suit the requirement of the artist for the particular occasion.

The importance of this last remark needs no comment. It has occupied my attention for months past. The demand for larger pictures than carte portraits has impressed upon me with renewed force a conviction of its daily increasing importance. For the recently introduced cabinet portraits, also, a lens capable of adjustment to suit either the small standing figure, or a large vignette head, on the same sized plate, would, I feel confident, be regarded as an acquisition by every intelligent photographer.

The problem proposed for solution stands thus:—Required a lens equal to the best form of existing portrait combination as regards rapidity of action, corrections for spherical and chromatic aberration, flatness of field, &c., which shall admit of adjustment, by mechanical means, so as to enable the photographer to introduce at will the required amount of spherical aberration or diffusion of focus for any given occasion.

To describe in detail the successive steps whereby I finally arrived at the solution of my problem would, I fear, unduly tax your patience. I may mention, however, that the idea of separating the two component parts of the negative combination of my triple achromatic lens renders an adjustment for amount (or quantity) of spherical aberration possible.

This plan, however, has two important drawbacks. First, a separation of the component parts of the negative combination, heretofore cemented, introduces two more reflecting surfaces. Secondly, the reduction of power resulting from a separation of the component elements of the negative combination is attended by greater curvature of field for the objective as a whole.

This led me to consider whether the desired end could not possibly be obtained by employing two combinations only, the lenses composing them of such form and so positioned that, by slightly altering the distance or separation between the component elements of one of them, the corrections for spherical aberration of the entire objective should admit of regulation as to amount, without at the same time disturbing the other necessary corrections of a perfectly constructed portrait lens.

That it is desirable to retain the front combination of such a lens a cemented compound, is obvious; for separation here is attended by much greater loss of light from reflection than by adopting a separation of the lenses composing the back combination. Hence my attention was directed to the discovery of a suitable back combination.

On inspection of fig. 3 (representing the original Petzval, or ordinary portrait lens) it will be seen that the lenses of back combination B occupy a position, as it were, of minimum aberration.

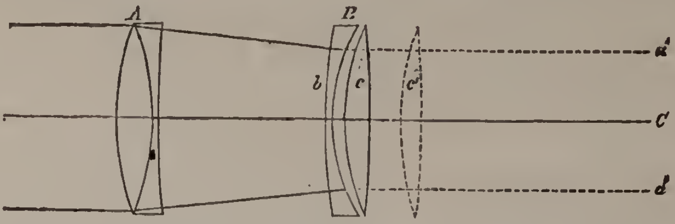

Fig. 3.

Thus the rays *a a*, after refraction by the front combination A, converge upon the meniscus flint-glass lens *b* of the back combination B, where, after refraction, they emerge nearly parallel, as is shown by the dotted lines *a' a'*. Hence, any alteration of position or distance of crown lens *c* from flint lens *b*, as represented by *c'*, has no sensible effect upon the spherical aberration of the axial pencils of the objective as a whole. But I may observe that any alteration of distance here greatly deteriorates the correction of the oblique pencils—or, in other words, greatly impairs the marginal definition; and the same effect also results from any variation of distance between combinations A and B.

If, now, it were possible to obtain a perfectly corrected portrait lens, with a back combination, the component elements of which are reversed both as regards their order of position and form, it is clear that both the lenses in this altered condition would then occupy a position, as it were, of maximum spherical aberration by form (see back combination D, fig. 4).

Also, in this case, rays *b*, *b*, after refraction by the front combination C, are incident upon, and refracted by, the crown lens *d*, and then strongly converge upon the negative or concave surface of the meniscus flint-glass lens *e*, as is shown by the dotted line *b'*, *b'*.

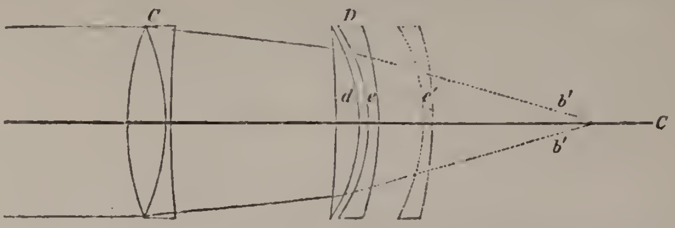

Fig. 4.

An increase of separation between these two lenses at once reduces the effective diameter of the correcting concave surface of the flint lens *e*, as shown at *é*, and positive spherical aberration for the objective as a whole is the result.

Thus, then, we obtain the means of regulating the amount of spherical aberration in a lens composed of two combinations (the same in principle as resulted from a separation of the elements of the negative combination of the triple lens already referred to), but without, as will be seen further on, the drawbacks already indicated.

The determination of the exact form and arrangement of lenses required to produce the necessary correction, including the above essential principle, has occupied my attention for months past; and, as will be seen from inspection of fig. 4, both the front and the back combinations of the new lens have resulted in forms essentially different from those of the ordinary portrait lens.

Thus, for the new combination (the ratio of effective aperture to focal length of which is as 1 : 3, or the same in rapidity as my well-known quick-acting portrait lenses, embracing an angle of about 60°, and free from distortion), the ratio of foci between the front and back combination is in the proportion of 2 : 3; the ratio of radii of the external surfaces of the front combination is as 1 : 5. The crown lens of the back combination is slightly of the meniscus form; and its adjacent surface, and that of the concavo-convex flint lens, have dissimilar radii of curvature. The radius of curvature of the anterior surface of the crown lens of the front combination, and the radius of curvature of the posterior surface of the flint lens of the back combination, are such that the refractions are equally divided between these two.

To obtain the regulation for amount of spherical aberration at will, the concavo-convex flint-glass lens *e* of the back combination D is mounted in a cell which admits of being unscrewed, and this affords the means of separating it from the crown lens *d*. Four divisions are marked upon the cell carrying lens *e*; and an index upon that portion of the back combination carrying crown lens *d*, and screwed into the tube or "body" of the lens, registers the amount of unscrewing or separation.

When the cell containing lens *e* is screwed home, the index pointing zero, the objective as a whole is perfectly corrected for spherical and chromatic aberrations, for both the axial and oblique pencils; and now, by unscrewing the back cell containing the posterior lens *e* (say, one, two, three, or more revolutions, or parts of revolutions, of screw), the correction for spherical aberration of the objective is sensibly modified, *i. e.*, positive spherical aberration, or diffusion of focus, results, without at the same time disturbing the other necessary corrections of the objective as a whole.

The effect of this unscrewing, or increased separation between lenses *d* and *e*, will be obvious to you on inspection of the proofs, hurriedly taken for me as illustrations by Mr. T. R. Williams. The lens with which the pictures were produced is on the table. It has an aperture of three-and-a-half inches, and a back focus of eight inches. It is without any diaphragms or stops.

On the one plate (8½ by 6½) are three busts, the heads measuring about one-and-a-half inches, taken in succession. On the other are two standing figures four inches high (the "cabinet" size), with numerous objects intentionally placed before and behind the figures.

The number of revolutions of screw (each equal to a twenty-fifth part of an inch) is marked upon the pictures; and, as will be noticed, when the posterior lens of the back combination is screwed home, the pictures are microscopically sharp on one plane. Then, with the posterior lens unscrewed, in the one case *two*, and in the other *four*, entire revolutions of screw, increased softness—or, in other words, diffusion of focus—is apparent. Of course, any intermediate effect can be produced at pleasure.

The results speak for themselves; and I will only add that nothing has been sacrificed to obtain this much-desired quality of diffusion of focus; but actual advantages besides the above over existing portrait-lenses have been secured by this new construction.

Thus, with the lenses of the back combination in their normal position, *i. e.*, the posterior lens screwed home, the correction of the oblique pencils for both the spherical and chromatic aberration is more perfect than in the best-constructed existing portrait-lens, on account of the smaller angles of incidence and refraction on the back combination; and for the same reason, also, a flatter field of view and better marginal definition are secured. The illumination is also more equal from centre to margin of the picture; and without a diaphragm the lens is free from distortion, and embraces an angle of about 60°.

The unscrewing, or separation of the posterior lens, besides affording distribution of focus, tends to greater flatness of field, increases the power or intensity of the objective as a whole, and does not sensibly impair the correction for chromatic aberration.

I purpose to manufacture the new lens of three dimensions as regards rapidity. First, quick-acting portrait-lenses, the ratio of aperture to focal length of which is as 1 : 3 (the same as my Nos. 1 and 3 B lenses); second, portrait-lenses of the ordinary rapidity, ratio of aperture to focal length as 1 : 4; and, third, portrait and group lenses, ratio of aperture to focal length as 1 : 6. Since the new lens is free from distortion, can be used with a large aperture, and includes an angle of 60°, I believe it will be found invaluable also for interiors, views, copying, &c., the more so, when I inform you that it admits of a construction which, when used with small central diaphragms, is practically free from the defect present, more or less, with all existing double combination lenses, viz., *a central spot* in the resulting picture.

Now it may be asked, If this new lens possesses (in addition to the sought-for quality, viz., distribution of focus at the will of the operator) all, and more than all, of the good qualities possessed by the old portrait combination, why was it not introduced ere this? My answer must be the old aphorism, "Necessity is the mother of invention."

And here I consider it but just to state, without such able articles as have appeared from time to time in the Photographic News, by Mr. Wharton Simpson (who, I believe, was the first who publicly advocated diffusion of focus or pictorial definition), and, besides, the pressure put upon me privately, in the first instance by Mr. T. R. Williams, and also by Mr. Jabez Hughes, Mr. Robinson, Mr. Mayall, Mr. Blanchard, and others, the instrument now before you would have remained *unmade*.

I now commit it to your hands; and it will be for you to determine to what extent I have succeeded in my endeavour.

The following letter, from Mr. T. R. Williams, accompanied the pictures sent in illustration of the above paper:—

"236, Regent Street, W., December 11, 1866.

"Dear Sir,—I have often dreamed of possessing a lens that could be made subservient to one's will, but never dared to hope for its consummation; so I cannot sufficiently express my delight with your new portrait combination, for it seems to realize all the desired qualities wished for in portrait photography. That it must take the place of all other lenses for the studio I feel convinced, as also that it will suppress the necessity of endeavouring to get soft pictures by the movement of the lens during exposure.

"It is indeed a great boon, and I congratulate you and my brotherhood on its successful production.—I am, dear sir, yours very truly, T. R. Williams.

"*Mr. J. H. Dallmeyer.*"

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A FEW EXPERIMENTS ON THE DIFFUSION OF SOLUTIONS, AND TIME REQUIRED FOR THEM TO PASS THROUGH ALBUMENIZED PAPER.

BY F. W. HART.*

The term diffusion suggests to many minds that grand and useful discovery by Professor Graham, which he named Dialysis. As an application, I believe it has been extensively employed to rid meat brine of its salt, leaving the rich albumenous liquid (which salt is known to extract) in the dialyser; this can be evaporated down for making extract of meat, soups, &c. Another and higher application of the laws of diffusion (also for the preservation of life) has been adapted in the ingenious apparatus invented by Mr. Ansell, having for its object the detection and giving alarm of that dangerous and fatal fire damp which every now and then, and conspicuously just now, shocks humanity by the ravages it causes amongst the miners.

The experiments of this evening will be carried on in an apparatus I have brought out for the use of analytical chemists, and which I was led to construct some four or five years since, to facilitate my researches on the properties of albumen. The nature of dialytic experiments does not admit of their being completed entirely before an assembly, as they mostly take from twenty to sixty hours for completion; and at intervals the diffusate is drawn off, evaporated to dryness, and weighed with great delicacy; or, when more convenient, the diffusate is estimated volumetrically. Therefore I shall only bring before your notice those which produce a comparatively immediate effect, and are most likely to be of use to you in your daily avocations.

Before proceeding with the experiments, I will give you the results obtained in what I will call a theory of sensitizing Albumenized paper being placed over the hoop of the dialyser, and a solution of twenty grains of nitrate of silver to the ounce of water poured thereon, and immediately placed on the liquid in the diffusate vessel, in two minutes and a half it gave indications of a portion of the silver having passed completely through the albumenized paper septum. Before making any remarks on this, I will relate two other experiments.

In the second experment, sixty grains of nitrate of silver to the ounce were taken (placed in the diffusate vessel as tor first experiment); this gave indication of passing through in one minute and a half.

Third experiment was with a twenty-grain solution of nitrate of silver, containing ·8-tenths of a grain of pure gelatine; first indication observed in this instance was after the lapse of three minutes. Now, perhaps for want of a better expression, I have called this theory, seeing that the conditions are not identical with your practice; but here we will try and arrive at useful facts by induction. It is seen by experiments, first, that for the nitrate of silver to pass from one side of the septum to the other, two minutes and a half were required. Now, in actual practice it is found that the paper must be floated longer on weak solutions, and consequently more liquid, with its other salts must pass through the albumen and be imbibed by the paper; and, in its turn, these salts require freer washing to eradicate them. Now, as an interchange must take place to complete the decomposition of the salt in the albumen, it is advisable that we produce the desired end in as little time as possible. In the second experiment it is seen that the silver has performed its office in one minute and a half; consequently less solution must have passed the albumen septum, and we have our active principles nearer the surface. Again, when the paper has been floated on such a solution, it dries much quicker, and leaves a relatively greater proportion of silver on the surface, which is considered to be essential to the brilliancy of a photograph.

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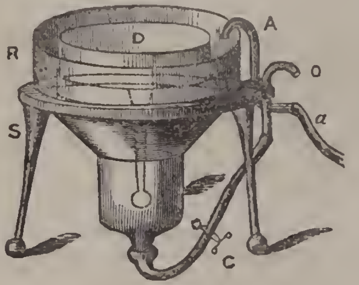
* Read before the South London Photographic Society, Dec. 13th, 1866.

I now come to the third experiment; here we have a *weak compound solution*, which has been highly spoken of, and I think deservedly so, as combating the ill effects by physical means of otherwise weak solutions. Here is a crystalloid and a colloid; the latter substance comes to a halt at the albumen septum; and if I am allowed the simile of a *crowd*, the former, or crystalloid, will be longer in performing its journey; but in this case, allowing it longer, we have that compensated for by such a compound solution, having a slower rate of motion, and the property of setting, which retains a greater proportion of silver on the surface of the paper than is the case with the simple crystalloid solution of the first experiment.

I will now leave these, and proceed with other experiments, where you can see the results.



Here we have our dialytic apparatus. In the body of the diffusate vessel is a shallow dish connected with a small tube which slides through the lower part of the apparatus, and is terminated by a pipette and one of our pinch-cocks to deliver drops as desired; over the dialysing apparatus we place a water-bottle to maintain the liquid diffusate at a constant level when it is dropping out below. Place a piece of insoluble albumenized paper on the hoop of the dialyser, fill the apparatus with water, and set the dropping arrangement in action; now we float the septum on the water, and pour in a solution of hyposulphite of soda, two ounces to the pint; then, after five minutes, a quantity of iodide of starch is taken, and in the experiment I have previously made, sixty drops rendered it colourless. Now, you must bear in mind that the quantity of hyposulphite to dissolve that quantity and render it colourless has passed through a column of eight to nine inches of water; at ten minutes twenty-four drops accomplished the same object; at fifteen minutes eight drops, twenty minutes three drops, and sixty minutes one drop. I have here taken the weakest solution that is considered safe for fixing. And now the results of the strongest at six ounces to the pint as follows:—In five minutes fifty drops, fifteen minutes eight drops, twenty minutes three drops, twenty-five minutes one drop. The experiments show us that hyposulphite of soda diffuses very rapidly under favourable circumstances, and that an arrangement of washing prints based on these principles can be carried out with little trouble and a moderate expenditure of water.

I will conclude with an experiment on our solution of hypochlorite of soda, or, as we named it for convenience sake, eliminating preparation. We put a piece of insoluble albumenized paper on the hoop, then on one side the eliminating preparation, on the other an iodide in solution with starch; in a few minutes the solution will have come in contact by diffusion, and the entire body of the paper will be coloured blue with iodide of starch.

THE LATE MEETING OF THE PHOTOGRAPHIC SOCIETY.

There is so much with which we agree in the following remarks in the *Journal of the Society*, that we reprint them entire:—

"The meeting held on Tuesday night in King's College will be memorable in the annals of the Photographic Society. An unprecedentedly large number of members, many of whom could only find standing room, had been drawn together for the triple purpose of hearing Sir Frederick Pollock, Bart., the much revered President of the Society; of witnessing the distribution of the medals; and of hearing the details of a very important optical discovery, calculated to effect a revolution in photographic portraiture, described by Mr. J. H. Dallmeyer.

'The meeting was an unwontedly enthusiastic one; and the roof of the library of the College echoed from time to time with plaudits which are rarely heard there. The eloquent address of the ex-Chief Baron, in which he reviewed the wondrous changes in the history of the world during the last seventy or eighty years, all of them coming within his own personal reminiscences, possessed an especial charm and interest. And the importance he attached to photography as one of the chief wonders of the century, taking, in his estimation, precedence (on account of its influence on the affections) of even the more commercially important developments of steam and electricity, strikingly illustrated the bent of his appreciation in regarding the advance of a nation in social and moral refinement as of greater importance than its development of the means of commercial success. We have rarely listened to anything more touching than the closing remarks of the President's speech, in which he referred to the relief he felt when, years ago, he was freed from the partisan duties of an advocate, to undertake his judicial functions on the bench. The relief he felt was especially based on the fact that, instead of the constant necessity of seeking to obtain a verdict, in his new duties he would simply have to elicit truth. After having graced the position of Chief Baron of the Exchequer for many years, he now felt a still greater relief in being released from the necessity of eliciting merely the unimportant truth of a case resting on the differences of A and B, in which, *per se*, he felt no interest, in order to enter upon the larger quest of truth in science, truth in art, truth in philosophy,—to search into all the arcana of nature, to know all that could be known, and, having found truth, to adopt and cherish it.

"Few things were more calculated to impress many of the young and ardent minds present than the spectacle of the venerable gentleman, who, having in boyhood carried off scholarships and presentations, won the highest honours at college, great success at the bar, and universal respect on the bench, has now retired, full of years and full of honours, with an intellect unabated in vigour, and, in his eighty-fifth year, enters with renewed zest on the search for truth, and congratulates himself upon the opportunities afforded by his retirement from active duty for that search as his chiefest good.

"The long-delayed medals were distributed at last amidst the loud plaudits of an enthusiastic assemby. The medals are in silver, containing on the obverse an excellent portrait of the Prince Consort, the late Patron of the Society, and on the reverse, a fine group representing Apollo in the chariot of the sun, being a copy of an engraving by

Bartolozzi, from an antique gem. A somewhat interesting feature of the distribution was the graduated applause which greeted the appearance of the various recipients, and indicated the general or limited popularity of their productions or persons. The appearance of Mr. Roger Fenton, for the first time for many years, in the Society, to receive a medal as its founder, was the signal for an outburst of loud and continued cheering; and a few graceful remarks, in which he personally, and as representative of the medalists generally, acknowledged their appreciation of the awards, were also greeted with hearty applause.

"Mr. Dallymeyer's paper, remarkable for its lucid explanation of some optical points too little understood by photographers, possessed the still higher interest of detailing an optical discovery, the importance of which cannot be overestimated. Mr. Dallmeyer has discovered the means of producing a lens which, defining with the microscopic sharpness of the most perfect existing portrait lenses, can also, at full aperture, be made to yield any amount of distribution of definition which circumstances can demand, and possesses at the same time unusual advantages in freedom from distortion, equality of illumination, flatness of field, rapidity of action, and other good qualities. This power of defining several planes sufficiently, without rendering any offensively, is a boon which only portraitists with a feeling for art can properly estimate; and we do not hesitate to affirm that Mr. Dallmeyer has done for artistic photographic portraiture a service equal to that which Petzval did to photography itself in rendering it, so far as optical instruments were concerned, a thing at all possible. The discussion on this subject was, from its great importance and the late hour, necessarily adjourned, and will be renewed, doubtless with great interest, at the next meeting. In the meantime, whilst we record our conviction of the superior advantages of securing diffusion of definition by optical in preference to mechanical means, we once more take occasion to thank Mr. Claudet for the impetus which his able papers have given to the public appreciation of the importance of the result to be obtained, namely, the pictorial rendering of a solid body upon paper with sufficient definition in all planes, and without offensive detail in any part."

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TERM OF ENGAGEMENT AMONGST PHOTOGRAPHER'S ASSISTANTS.

It has not unfrequently happened that we have been asked to decide the proper tenure of an engagement subsisting between photographic assistants and their employers. As a general rule the tenure depends entirely upon the terms of an engagement and the mode of payment. The following case, referring to the matter, will be read with interest by many of our readers.

(*Sittings at Nisi Prius in London, before Mr. Justice* Willes *and a Common Jury.*)

TAGLIS COZZO V. DISDERI.

This was an action to recover damages in consequence of the plaintiff having been dismissed before the expiration of the term for which he had been engaged to serve the defendant.

Mr. Serjeant Parry and Mr. Pearce appeared for the plaintiff; and Mr. Matthews for the defendant.

The plaintiff, an Italian, was a photographic artist, and the defendant was a photographer, having establishments in Madrid, Paris, and latterly in London. M. Leon managed the business in London, and the case for the plaintiff was that in March, 1865, he was employed by him to assist in establishing the business in London. In October following he saw the defendant in London, and entered into a verbal agreement to enter his service for a period of twelve months from the previous September, at a salary of £15 a month. He continued in the defendant's employ down to March, 1866, when he was dismissed upon a week's notice. At the commencement of January the plaintiff was asked to sign weekly receipts for his wages, and after protesting that he was not a weekly servant he signed the weekly receipts to oblige the defendant, and after that defendant had stated that the plaintiff should have a month's notice at all events. Subsequently M. Leon wished him to sign a paper to this effect—"I consent that Mr. Disderi may send me away when he likes, without giving me notice, paying me from day to day if he thinks proper." The plaintiff refused to sign it. In cross-examination the plaintiff admitted that all the other "operators" held their situations upon the terms of a week's notice, and that after his dismissal he wrote to the defendant begging that he might have a month's notice of dismissal, and saying nothing of the yearly engagement. The plaintiff, however, added that he had written in this form at the suggestion of M. Leon.

The defence was that the plaintiff, like the other persons in the defendant's establishment, had been engaged upon a weekly hiring, but that when it was wished to dismiss him the plaintiff claimed a month's notice, as he had theretofore been paid by the month. After some negociation a month's notice was given, and it expired on the 19th April. The plaintiff, however, was continued on until the 12th May, when he was finally dismissed. He was on that occasion offered a week's salary, which he refused.

His Lordship expressed his opinion that the plaintiff had not made out a yearly hiring, but he left it to the jury to say whether plaintiff was entitled to a month or only a week's notice.

The jury thought that he was entitled to a month's notice, and they gave him a verdict for £15.

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Proceedings of Societies.

South London Photographic Society.

The usual Monthly Meeting was held at the City of London College on the evening of Thursday, the 13th, the Rev. F. F. Statham, M. A., F.G.S., in the chair.

The minutes of a former meeting having been read and confirmed, Mr. F. Beasley and Mr. J. S. Dismorr were elected members of the Society.

Mr. How exhibited some very excellent photo-micrographs, sent by Dr. Woodward, of the United States Army, to Dr. Maddox.

Mr. Ennel asked if the members were aware of a method by which paper prints might be produced from a stereoscopic negative taken in a binocular camera, which would not require cutting or transposition previous to mounting. He then proceeded to describe how this might be done (see p. 602.)

Mr. Hart then proceeded to read a paper on Dialysis as Applicable to Fixing and Washing Prints, illustrating his observations by practical experiment, showing how completely the hyposulphite of soda passed through the diaphragm of the dialyser from a solution placed in it (see p. 607.)

After some general conversation on the subject, in which Mr. Hart stated that if prints were placed on a piece of stretched fabric or on perforated zinc, each print slightly overlapping the other, and a constant stream of water kept up, the hypo would be completely removed by a process of dyalysis, the albumen surface itself forming the septum,

The Chairman asked if Mr. Hart had devised any especial plan or apparatus for the practical application of this principle to photographic purposes.

Mr. Hart replied that he had not, at present, made any special application of the matter.

Mr. Wharton Simpson said he apprehended that it had been rather Mr. Hart's aim to bring before photographers a beautiful discovery in chemistry, which, being of modern date, was probably not well known to amateur chemists, than to propose any definite plan of applying it. Professor Graham's system of dialysis, which Mr. Hart had explained and illustrated, might probably, when well understood by photographers, find its use in a variety of forms in photographic processes. For the present he believed it had been Mr. Hart's aim to bring the matter before them, suggesting some of its uses, but leaving its precise application to be made by photographers themselves.

Mr. Hart said this was essentially his object.

Mr. Jabez Hughes said that two methods of working in all applications of science were open, by either of which harmony between theory and practice could be arrived at. It was possible to commence with practice, and work back to theory, or to commence with theory and then find its application in practice. Mr. Hart now brought the latter plan before them. He illustrated the beautiful process of dialysis discovered some few years ago, by which what were termed crystalloid bodies (such as salt), and colloid bodies (such as gelatine), when in one solution, could be easily separated, the crystalloid bodies passing through the dialyser and diffusing themselves into the water underneath, whilst the colloid body remained. Mr. Hart had shown them that by this process, if a plan of adopting it were employed, and time were allowed, every particle of hypo must, by the operation of the law discovered, eventually leave the print. The principle was one which was full of interest, and well deserved attention.

After some desultory conversation,

Mr. **Ennel** referred to the discussions, at the Parent Society in 1859, on washing prints, when he recommended the syphon system, which was generally now, in some form or other, adopted.

After some further general conversation, the subject dropped.

Mr. **Ashton** then exhibited some photo-relievo prints, coloured by a method which he had patented. The principle depended on the application of colour at the back of the image, so that the photograph, in semi-transparent ink, was over the colouring, giving a soft and pleasing effect to colours simply and crudely applied. One of the prints shown was coloured by means of a chromo-lithograph with a few tints, being applied at the back. Mr. Ashton explained the method of obtaining register, and showed pictures in various stages. He also exhibited some fine photo-relief prints, some gelatine reliefs, metal plates, and a press with which he illustrated the mode of working.

A general conversation on the subject followed.

Mr. H. **Cooper, Jun.**, then exhibited some negatives, which, having stood unvarnished for a few weeks in a room, were found to be covered with minute pinholes, although quite perfect before. The only cause he could suggest for it was the presence of a packet of chloride of lime in the room, which was, however, packed in two papers. He wished to know if any of the members had met with anything analogous.

Mr. V. **Blanchard** said that some years ago he met with a similar result, which he was able to attribute to a similar cause, the presence of chloride of lime. He had found that the air at the sea-side, loaded with moisture and spray containing chlorides, at times had a similar tendency.

A general conversation on the subject followed. Various suggestions as to the cause, such as the hypo having been imperfectly washed out, &c., were discussed. After some votes of thanks the proceedings terminated.

Correspondence.

FOREIGN SCIENCE.

[from our special correspondent.]

Paris, 19th December, 1866.

M. **Poitevin** communicated to the French Photographic Society, in its sitting of the 7th instant, the following account of his process for preparing heliochromic paper. He said:—"Though nearly a year has elapsed since I described the means of obtaining the natural colours on paper, very few persons, so far as I am aware, have tried the process. I cannot imagine the cause of this unfavourable reception, unless it be the fact that I omitted to state how I prepared the subchloride of silver paper, which, however, was easily obtainable ready made. The reason why I did not explain this matter at once was, simply, that I had only discovered one successful method, and that I was then occupied with experiments in the hope of finding others still better. The following is the process I have employed ever since the 10th of August, 1865:—On the surface of non-albumenized photographic paper I form a coat of ordinary chloride of silver, by laying each sheet, on one side only, in a bath of chloride of sodium, containing ten parts of salt to one hundred of water; after drying, I apply it on a bath of nitrate of silver, of the strength of 10 per cent. I can also attain the same end by covering, with a large pencil, one side of the paper with a uniform coat of a mixture of equal parts of a saturated solution of bichromate of potash and a solution of sulphate of copper in the proportion of 10 per cent. I leave the sheet to dry in the dark, and then apply the prepared surface on the nitrate of silver bath, when chromate of silver is formed. I next wash freely in water, to remove the excess of nitrate of silver; and to the last water used I add, drop by drop, ordinary hydrochloric acid until the red chromate is transformed into white chloride of silver. These two ways of obtaining the coat of chloride of silver are equally effective. To procure the violet subchloride, I pour into the vase containing the paper immersed in water a small quantity of a solution of protochloride of tin, at 5 per cent. strength. About 20 cubic centimetres (two-thirds of an ounce troy) are required for each entire sheet. Without taking the paper out of the bath, I then expose it to the light, always preferring a shady place. Its surface is promptly tinted, the dark violet desired appearing in from five to six minutes. The paper must not be left longer in the light, or it will assume a greyish black colour unsuitable for heliochromy. After the action of the light, I wash the sheet in several waters, and hang it up to dry in the dark. The paper in its present state is almost insensible to the action of light, and may be kept a long time, so that a good number of sheets can be prepared beforehand, provided they be carefully put by in the dark.

When I described my heliochromic process, I fully explained how I rendered the coat of violet subchloride capable of receiving the impression of the natural colours. I therefore will not go over the same ground again, but will merely add that the experiments I have since made have taught me that the coloured proofs which kept best (I have several above a year old) are those for which I employed only the mixed solutions of bichromate of potash and sulphate of copper as a sensitizer. The chloride of potassium, or any other chloride, gives additional rapidity, but they have the inconvenience of reconstituting, in the whites of the image, ordinary chloride of silver, which takes, moreover, less tint during the operation; and this cannot be afterwards got rid of. I have also found that the best fixing bath is water acidulated with sulphuric acid; a very diluted solution of bichloride of mercury acidulated with the same acid has nearly the same effect. The acidulated water dissolves certain compounds of silver, which form in isolated spots, and after washing and drying in the dark, the coloured image is scarcely, if at all, sensible to light. It may be kept uninjured in a portfolio or album, and even viewed by artificial light, without any inconvenience.

Several members who, at the previous sitting, had taken specimens of the leptographic paper, next gave an account of their experiments.

M. Paul Gaillard directed attention to the delicacy and vigour of the images which he had obtained. He believed that the new paper would keep longer than the albumenized, and dwelt on the great advantages it presented in the case of weak clichés.

M. Pector thought that it would be easy, with a little care, to avoid abrading the surface.

M. Regnault, who had made numerous experiments, remarked that the Saxe leptographic paper bore washing as well as the albumenized. The printing is more rapid when not carried too far. The fixing with the sulphocyanide in the proportion of one-tenth is effected in half a minute; the proof is then washed and put into a weak gold bath. The change to black is very rapid. The proof is again passed through the sulphocyanide, and afterwards finally washed. M. Regnault especially noticed the great advantage occurring from the saving of time in washing, owing to the absence of nitrate of silver.

The porcelain papers also work well, provided that, instead of plunging them into the baths, they are merely laid on the surface of the fluids, which can be done without any inconvenience, as they require but little washing.

In this sitting the Society also awarded the annual medals to MM. Marechal (of Metz) and Tessié (de Mottay) for their photographs on glass, delf, lava, &c.

Ernest Lacan.

ASHTON'S PATENT.

Sir,—I was much surprised to read in your last issue a letter from Mr. Robert H. Ashton, of Manchester, claiming patent rights in a method of producing coloured pictures by super-imposing coloured papers on a glass transparency.

Mr. Ashton's graphic account of how he discovered it reads like a new edition of the well-known tale of stumbling over the silver mine of Potosi. Unfortunately, it was all well known years ago; and I must protest against photography being hampered with such patents. In the years 1858, '59, and '60, I produced grosses of such pictures, being at the time engaged in doing transparencies of instantaneous and other subjects; but I should never have dreamed of patenting it, as it appears to me to be simply such an adaptation of a well-known process as would suggest itself to any intelligent person. The method of executing these pictures was identical with Mr. Ashton's, and the results very pretty. A series of stereoscopic views of Normandy, and also a large set of English abbeys, were thus issued. Mr. Ashton's way of producing moonlight, &c., was in continual use. No particular skill is required, as the shading is given by the tones of the picture itself. I was present at the photographic dinner where the picture Mr. Ashton speaks of was handed round, and my impression was the same that the talented writer of "Echoes of the Month" arrived at, viz., that it was one of the large variety of pictures that may be produced by Mr. Woodbury's process. This picture had a lithographed background, and was intended for viewing in the same way as an ordinary picture, as were many of mine. In fact, they were done as transparencies, or otherwise, at pleasure.

I have no doubt Mr. Ashton was not aware he had been anticipated in his discovery. At one time it was of great commercial value, but not now. Very great vexation has been caused by re-invention, and much angry controversy; but I really cannot conceive how it could have been supposed that so simple a matter had not been before thought of. I well remember how the idea first suggested itself to me, by a number of transparencies being placed on a tablecloth for sorting into numbers; and it was observed that the colours gave a greatly heightened effect to those which happened to be appropriately placed. The first I did were interiors of a conservatory, with figure, for Chas. Howell, Esq., F.R.A.S., at whose observatory I was then engaged, photographing the moon.—I am, yours respectfully,

Samuel Fry.

PHOTOGRAPHY BY USE OF THE MAGNESIUM LIGHT, LENS CHESTS, ETC.

Sir,—I have read with much interest the account of Mr. Waldack's proceedings in the Mammoth Cave by the magnesium lights, and also your remarks upon the same. But there are, I doubt not, many of your readers who may not have occasion to work under so many difficulties, to whom, at the same time, the magnesium lamp would be useful. The accompanying is the first photograph I have done by that medium. The subject is a reredos of a small Catholic chapel; the only light being behind the object, it would be better without it. The lens I used is Dallmeyer's triple with No. 2 stop, the time of exposure about seven minutes, keeping the magnesium burning, and moving the lamp so as to light the object as evenly as possible. The lamp is one of Mr. Solomon's, and I believe the next time I use it, I shall understand it better, as I find it is better to keep it wound up, by giving it a turn every half minute or so. I did not find the white smoke troublesome, although my lamp has no chimney; but perhaps it would do so in a more confined place. There was a considerable quantity of oxide on the reflector, but it is easily removed. I have no doubt it would have made a better picture could I have thrown the light on it more sideways.

And now a word about the lens chest, and how to furnish it at the smallest cost compatible with efficiency. Being a country photographer, I undertake any description of work, and I suppose many others to be in the same position. I of course know what I am about to write is very generally known; but there may be some to whom it may be useful. As I have to take many views of various sizes and very different subjects, it is absolutely necessary to have several lenses of different focal length. The porch and baptistry, and Norman staircase, were done with an old half-plate portrait lens without a maker's name. I do not use the back combination, but reverse the front lenses, by screwing it in the back of the mounting. As the front combination is not so large as the back, I have to bind a strip of black cloth round it to make it fit, and a stop cut out of cardboard blackened, with an orifice half an inch in diameter. An old quarter-plate lens, a carte, or stereo lens, might be made to take cabinet views of similar subjects. The east end is taken with Dallmeyer's triplet, but that would not do the ruins; they are taken with Dallmeyer's wide-angle landscape lens. For cabinet size of smaller subjects I use Ross's 5 by 4 doublet, which answers admirably. The above instruments are not expensive, and will answer all ordinary purposes for the sizes mentioned. I have taken one negative of the high altar of a Catholic Church with Dallmeyer's new portrait and group lens, and it gives great satisfaction. I have only spoken of some few of the many lenses at our command, and not of what we may expect. Mr. Dallmeyer promises an instrument to embrace a view of upwards of 100 without distortion; that will be a great boon. I have a compartment in my chest ready to recieve it; it is to cover 12 by 10, and the cost to be moderate. At the same time, I prefer to use single lenses of long focus where I can; I shall therefore continue to make use of the front combination of my large portrait lenses reversed, as I have hitherto found them to answer well for gateways or buildings that are not too high, and where there is plenty of room. For stereo work I have a pair of Dallmeyer's double combination; they will do nearly all that is wanted. I reverse them sometimes, and get a good pair of long focus single lenses. When it is impossible to get what is required with the above, I find it convenient to make use of a pair of globes, but not if the others will do the work, as they make the foreground too large, and the buildings too small and too far off.

If these remarks, or any part of them, appear to you worth publishing in your valuable Journal, I shall be happy in believing they contain some hints that may be useful to some of your numerous readers.—I remain, yours obediently,

A Man of Kent.

COLOURING PHOTOGRAPHS AT THE BACK.

Sir,—A thought has just crossed my mind, which I now entrust to you, if you will kindly record it in the News; it may happen that some clever operator may be induced to try it. Some time since, a specially prepared albumen paper was on sale, so prepared that the film could be transferred to glass. Could not a portrait be printed on this sort of paper, then transferred to plain glass, and then coloured behind, so as to show the colour through? But perhaps it has been tried; if so, I should be glad to know with what success.—Yours truly, Thomas Gulliver.

18, *Union Street, Swansea.*

[The principle of colouring at the back suggested has been tried, but we think that there is more still to be done in that direction. We have produced some very pleasing results by printing on collodio-chloride on glass, colouring, and then transferring to paper. Comparatively crude colouring produces excellent results.—Ed.]

Talk in the Studio.

Photo-Basso-Relievo.—The difficulty attending any effort to produce photographic cameos of coloured objects in due relation of relief will be apparent to all who give a little consideration to the subject. The part reflecting the most light is naturally the most prominent when produced by photography. Thus the white of the eye would be in relief, whilst the pupil would be a hollow, and so in other matters. Mr. D. Winstanley, Jun., is, we understand, engaged in experiments in photo-basso-relievo, and, we have reason to believe, has devised a method of overcoming many of the difficulties attending it. Mr. Woodbury is affording Mr. Winstanley facilities in the use of apparatus, &c., used in his own operations. The process is, we believe, patented.

Photographs of "Brasses."—We had recently an opportunity of examining an example of an interesting application of photography for the multiplication of designs obtained from the rubbings of brasses. Photographs of brasses and of rubbings have before been produced; but in this instance the rubbing was used as the negative, and copies, consisting of prints from the original rubbing, were exceedingly effective. From such prints it would be easy to make photographic reductions so as to produce a series of uniform size, either for publication or exchange. We shall probably have something more to say on this subject shortly. We now merely throw out the hint.

Mr. Dallmeyer's Patent Lens.—In commenting upon an abandoned specification by Mr. Dallmeyer, Mr. Sutton, of Jersey, recently claimed the idea involved in the provisional specification as his own. As it was not found by Mr. Dallmeyer to be efficient in practice, he abandoned it for another and better mode of effecting the end in view; and as it was abandoned for this cause, it was not a matter of importance to discuss its origin. Our able and intelligent correspondent, Mr. Baynham Jones, who has had an extensive experience in such matters, sends us, however, some remarks which are pertinent to the subject. After stating that Mr. Sutton's claim has just been brought under his attention by a friend, he says:—"In the present case he is singularly unfortunate in his claim, the right to which is founded on the contents of a letter to Mr. A. Ross in December, 1858. His extract is as follows: 'It now remains for me to say a few words about achromaticity. If each of the three lenses were separately achromatic, the combination would be achromatic; but this would be a bungling way of achromatizing it, and would involve loss of light. If the concave lens be made of a material bearing a suitable dispersive ratio, the lenses may each be single lenses, and the combination will be achromatic. This ratio may be found by means of a formula which I have calculated for the purpose.' Now, it unfortunately happens that this idea had been practically carried out very many years before the date of Mr. Sutton's letter, and probably before he was born. I have now in my possesion a telescope, which I have had nearly forty years, with a triple achromatic object-glass. I have seen such a lens, made by Chevalier, at least twenty years since, for photographic purposes, and I believe I am correct in saying that both Archer and the late Mr. Ross made some about the same time. Mr. Dallmeyer does not claim the invention of the triple lens, but merely that he has succeeded in doing what no other person has done, viz., constructing a triple lens with a very large angle and splendid definition, and at the same time a great amount of light."

To Correspondents.

James Date.—Mudd's instructions for the collodio-albumen process are most valuable, and we know of no process we can so strongly recommend for certainty and excellence of result. The Gordon modification is valuable where rapidity is required; but it is necessary to work with great care and delicacy, and the keeping qualities seem uncertain. The examples we have received from B. B. of plates kept a month have, however, been very good. We hope he will send us his experience shortly. An aqueous solution of pyrogallic acid without acetic or citric acid soon becomes decomposed and useless. The plan suggested by Mr. Fry, of using two kinds of plates, one for long and the other for short exposures, is a very excellent one. Gallic acid solution for long keeping plates may be made four grains to the ounce; it is not soluble in water in greater rates than five grains to the ounce. We are glad that you derive profit from our pages. The Year-Book will be ready in a few days from the time we write.

C. H. J. (Hastings).—The negative arrived broken in several pieces. So far as we can judge from the fragments, the spots might be due to various causes; but they have the appearance of arising from turbidity in the bath, or in the collodion. Our duties keep us so much engaged that we have not, we regret, time to write private letters on such subjects.

R. W.—The only instructions which we can give you as to the lighting of a group in such a studio must be of a general character. You have three things to study in such a case: 1st, the artistic arrangement of the group, so that the composition shall be good; 2nd, the arrangement of each figure so that it shall not intercept the light from other figures; 3rd, the arrangement of the figures so that they shall all be as satisfactorily defined as possible, to effect which they must form something like a half circle curving towards the camera. A little thought, patience, and judgment will serve you best; but at best it is almost impossible to succeed very well with such a group. 2. Some of the spots in the prints enclosed are probably due to imperfections in the paper. Several are, however, due to the formation of minute air-bubbles on the print whilst in the fixing bath, which, by preventing perfect fixation, produce the small yellow spots of hyposulphite of silver. They may be touched out with water colours. In No. 1 print there is indication of a little abnormal deposit, or tendency to fog in the negative. 3. The chief fault of No. 2 is that it is a little over-intensified. The tone of the print is pretty good. 4. Hyposulphite of soda may be kept safely in solution before it has been used; but when prints have been fixed in it, it is not safe for use again. 5. Unless you can tell us what caused the stain, we cannot very well tell you how you can remove it; it is, moreover, very difficult to remove any stain perfectly from a light-coloured woollen fabric. We shall at all times have pleasure in helping you.

A Constant Subscriber.—There is no work devoted to the subject of producing photographs in natural colours which gives any detailed information. The information is scattered over the pages of the Photographic News. In a series of articles which appears in our Second and Third Volumes, M. Becquerel describes his various experiments and the mead of success he obtained. Our Sixth, Seventh, and present Volume contain articles by M. Niepce de Saint Victor, who has continued a similar series of experiments to those of M. Becquerel. The last number in our Ninth Volume contains details of the operations of M. Poitevin in producing colours on paper. The experiments of M. Becquerel and M. Niepce de Saint Victor were on silver plates, upon which a film of chloride of silver was formed, either by chlorine in the form of gas, or by some solution of a chloride, such as chloride of copper, &c. If you wish to experiment in this direction it will be wise to read carefully all that has been published on the subject.

F. T. Stowell.—The address of the manufactory of leptographic paper is 26, Boulevard de Courcelles. It is difficult to say which is the best toning bath. That which is best in the hands of one person does not always succeed in the hands of another. For warm tones, we should say the acetate bath; for black tones, the lime bath. For glass transparencies, much depends on the character of the picture and the colour required. Some persons use a neutral solution of chloride of gold. An excellent tone is obtained by using a dilute solution of bichloride of mercury, followed by a dilute solution of sulphide of ammonium.

G. Fuller.—As a rule, you will find that enlargements with the lime light will take a much longer time than three minutes. The time will be governed, of course, very much by the extent of the enlargement; but it will rarely be much less than ten minutes. Some means should be taken to keep the paper moist if it have a tendency to dry. You may use the ordinary nine-inch condenser of the solar camera for the work; but one of this diameter, of shorter focus, and double convex in form, would be better. 2. Almost all the practical knowledge of enlarging by artificial light in existence has been worked out by the persons using it, and each person has his own method. The lime light is generally used for the purpose; but some use the electric light, and some few the magnesium light. 3. You will find some information on the use of the lime light for enlarging in some articles in our Fifth Volume.

A. B.—Some artists use opaque water colours in colouring the flesh tints; but we do not consider the results good. It is not unusual to apply opaque white to the high lights of a water coloured photograph; but except to correct some defect in an imperfect photograph, the practice is not good. Newman's preparation is expressly intended not to leave a glaze on the picture. Glaze is not a desirable quality in a coloured picture, except where it is required to give depth or transparency to shadows. For water colours use the ordinary pure, transparent cake colours. "Newman's Harmonious Colouring Applied to Photographs" is the best and cheapest manual you can have.

J. C. Paterson.—The spots are the result of imperfect fixation in small points. Minute air-bubbles have formed on the print whilst in the hypo, which, preventing the perfect action of the fixing solution, has left at each place a small spot of insoluble hyposulphite of silver, which decomposes in the light, causing yellow spots. Examine the prints in the hypo, and remove any minute air-bubbles, which sometimes cling very tenaciously to the prints.

Dominico Del Re (Geneva).—The subscription to the Photographic News by post is 17s. 6d. in advance. The Year-Book is nearly ready. We will forward it.

Thomas Lewis.—A toning bath becomes exhausted of gold gradually by every print toned, but none of the other components are removed; hence the addition of chloride of gold alone will often maintain its toning power. If the chloride of gold be acid, it should be, at the time of adding, neutralized with chalk; and it is well, if the bath be kept long in use, to refresh it with solution prepared as at first, only in a more concentrated form.

Several Correspondents in our next.

Photographs Registered.

Mr. T. C. **Hammond**, Ripon.
Photograph of Rev. E. Baynes Badcock.
Mr. **Seed**, Bristol,
Photograph of the late Mr Jones, Draper, Bristol.
Mr. John **Aylmer**, Dublin,
Photograph of Rev. M. Macmahon.
Mr. J. T. **Clarke**, Stockton-on-Tees.
Photograph—Group of Mr. T. Walton and others.
Mr. M. **Boak**, Great Driffield,
Photograph of Sir Tatton Syke's Memorial.
Photograph of Pickering Church, Yorkshire.

THE PHOTOGRAPHIC NEWS.

Vol. X. No. 434.—*December* 28, 1866.

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PORTRAIT LENSES WITH DIFFUSION OF FOCUS.

In his recent paper describing a portrait lens, in which, without sacrifice of rapidity or any point of excellence, the operator could produce diffusion of focus at will, Mr. Dallmeyer explained that it was owing to public and private pressure, from sources which he deemed influential, that he had been induced to give his attention to the production of a lens with the quality in question, mentioning articles written by ourselves in these pages as contributing largely to the pressure referred to, and adding his conviction that we were the first to advocate publicly the production of lenses with positive spherical aberration for the purposes of pictorial photography.

A contemporary takes exception to this, and states that our suggestions and Mr. Dallmeyer's practice were anticipated in his own pages, quoting an article appearing in April, 1864, as containing the "anticipatory" matter. We shall show that this article appeared years after we had publicly advocated such lenses, and years after Mr. Dallmeyer had, for special purposes, made such lenses; and that, for anything which appears to the contrary, the idea of the so-called "anticipation" might have been derived from our own pages.

We may say, at the outset, that we can scarcely hope that the discussion of claims of this kind can be vitally interesting to all our readers; but we must crave the indulgence of those least interested, on the simple ground that if erroneous allegations pass unchallenged, they are afterwards regarded as acknowledged. This matter is scarcely worth discussing: the tribute paid by Mr. Dallmeyer to those gentlemen whose countenance encouraged him in attempting what opticians have generally held to be heretical, was a graceful one; and as every gentleman best knows what causes have influenced him, an allusion to them rarely becomes matter of dispute. But as in this case a contemporary has felt it to be good taste to dispute the matter, it is only fair to say that Mr. Dallmeyer had not seen the "anticipatory" paragraph in question, but adds that, if he had seen it, it would neither have aided nor encouraged him in the production of the lens in question.

As we are ever anxious to give honour to whom honour is due, let us see the value of the anticipation. The article containing it appeared in our contemporary, April 15th, 1864, and was written by Mr. J. T. Taylor, a gentleman whose name, since it must be mentioned in discussing the matter, we wish to treat with the utmost courtesy. It mentions incidentally, in one paragraph, that a certain orthoscopic lens could, by an arrangement not described, be made to possess depth of focus, a quality mentioned as for many purposes "rather advantageous than otherwise." We have since been informed by Mr. Taylor that the arrangement consisted in a means of separating some of the components of the lens. The description of this modification of the orthoscopic lens—or, rather, not the description, but the allution to its existence—constitutes the "anticipation" of our suggestion and of Mr. Dallmeyer's practice. It is not our desire to depreciate the modification in question. We have no means of judging of its adaptation to its end, as the data are not on record; but we are quite willing to assume that it was efficient. But there are two or three things to be remarked in relation to the matter. First, it was not for portraiture, and useless for portraiture; it was a view lens, and the remarks made about it in the paragraph published at the time refer solely to views. Second, it was only incidentally referred to, was faintly recommended, and not described, and it was in April, 1864.

Our earnest advocacy of the production of portrait lenses—and it is to portrait lenses the question really belongs—with a sufficient amount of aberration to give depth of definition, to which Mr. Dallmeyer refers in mentioning us by name, dates from a period several years earlier, certainly from 1861. Mr. Dallmeyer's production of portrait lenses with facility for separating their components to give such depth, dates, to our knowledge, from about as early a period. We have in our possession a portrait lens, with a separate piece of tube to screw between the front and back lens, and by the separation produce "depth of focus," made for us by Mr. Dallmeyer five years ago, and we have pictures with such depth taken at the time. In our Year-Book, just issued, Mr. Williams mentions portrait lenses with the same facilities, made for him several years ago. The truth is, that the means of producing aberration by separating the lenses is nothing new, but a thing well known to opticians. It has not been generally practised, simply because it was a clumsy mode of effecting the end, having serious drawbacks, limiting the field and destroying the marginal definition. The especial advantage claimed for the lens recently introduced was not the simple possibility of destroying the correction by separating the parts, but the possibility, in a perfect portrait lens, of introducing the required aberration in a scientific manner, by simple means, in any required degree, and without the introduction of any other evil, such as loss of marginal definition, loss of light, or loss of chromatic correction, and consequent destruction of the coincidence between visual and chemical foci. If we appreciate the recent communication properly, it is not simply that it announces that a certain lens will give depth of definition, but that it describes a principle upon which, without any loss of any kind, this depth-giving quality can be conferred on all portrait lenses.

Having referred to what was *done* before this "anticipatory" notice of April, 1864, let us glance at the extent to which our *suggestions* were anticipated by the paragraph of that date. The truth is, we have held the "heresy" almost from the time we began to think about lenses. How early we wrote on the subject we cannot with certainty say, for having been writing on photography for the last ten or twelve years, we are uncertain when we first gained courage to publicly confess our heresy. For our present purpose an article written in June, 1861,* devoted entirely to this subject, is sufficiently in advance of this anticipatory paragraph of 1864 for every purpose. In the article in question, which was part of a controversy with Mr. Shadbolt, who insisted on the use of perfectly corrected lenses, having only one plane in focus, as the only good instruments, we pointed out the various modes possible of obtaining depth of focus, or—to use a better term, which in that article we for the first time suggested, and which has been much used since—depth of definition; and pointed out that, whilst for pictorial purposes the quality was absolutely necessary, it was only possible to obtain it for portraiture by the introduction of a certain amount of aberration; and we maintained, that if a lens possessed qualities suited to the work it was required to execute, it was absurd to call it a "bad" lens. The whole article bears especially on the questions recently in discussion; but we will only quote two or three paragraphs, as follows:—

"There can be no doubt that the exigencies of pictorial art demand the presence, to a certain extent, of this quality, which has been called 'depth of focus.' A portrait with the eyes sharp, and the nose and various locks of hair little more than indistinct blurs, is something very hideous; and yet we have seen this where a lens of short focus, defining very accurately objects on a mathematical plane and nothing more, has been used. A landscape with a few objects crisp and well defined, and the rest a mass of indistinctness in which neither form nor texture are indicated, is simply intolerable and worthless.

"Some depth of definition, then, is absolutely necessary to pictorial effect. A portrait lens must have sufficient depth to give, with judicious management, all parts of the body with something like satisfactory definition; all parts of the head should, at least, be fairly defined, so that when the focus is on the eyes, the nose and retiring locks of hair may not be perceptibly out. In a landscape much greater depth is necessary, and in view lenses always exists to a greater or less extent, and is also more readily obtainable by other means than in the case of portraiture.

"There are several sources from whence this depth of definition may be obtained. It may sometimes be obtained from what is called a bad lens; that is, a lens imperfectly corrected for spherical and chromatic aberrations. If it be thus obtained, it may, by rare accident, be in just the desirable ratio for artistic purposes; but it is more frequently at the entire expense of anything like defining power at all, and renders the lens comparatively worthless. In the ordinary view lens a certain amount of depth of definition necessarily does exist from the simple fact that it is impossible to correct it entirely for spherical aberration; but the aim of the optician is always to correct it as perfectly as he can. Depth can also be obtained in the best corrected lenses by the use of small stops; by their use the rays of light are made, in crossing, to form a much more acute angle, so that definition over a greater depth of space is obtained. Depth of definition can always be obtained by retiring sufficiently far from the nearest object to be taken, so as to render the distance of all objects beyond as nearly *nil* as possible, in relation to the length of focus of the lens.

"As regards the last-mentioned method, it is clearly out of the question to think of adopting it to any extent in portraiture, as it would involve the use in all cases of very long rooms, and of lenses of very long focus; and it is also frequently difficult, even in landscape work, to use it largely. The use of stops for the purpose is doubtless very legitimate, and often desirable; but even this has its limits, as the use of very small stops not only involves very considerable loss of light, but also materially diminishes the relief and boldness of the picture, giving it a flat and map-like effect; if, moreover, the aperture be reduced too much, we have not only these evils, but actually err on the other side, and obtain definition of nearly equal distinctness in foreground objects and those perhaps miles away.

"The use of bad lenses seems a thing unnecessary to discuss. No workman would willingly use a bad tool; and where this badness arises from incapacity or carelessness on the part of the maker, although it may now and then, just by accident, give a near approximation to desirable results, it cannot be relied on, and must be ignored as out of consideration. But there are good lenses which possess this defining power over a considerable depth, without losing in an appreciable degree the power of giving the best definition to objects more in focus. It is unnecessary to discuss, nor would it profit the majority of photographers to know, whether this quality is the result of over-correction for colour, or under-correction for spherical aberration, or both; or the result of a judicious antagonism of forces on the part of the skilful optician. But we think it important in the interest of those who, in practising photography, aim at producing pictures which shall possess definition over as great a depth as the artist would give it in his painting, to state that lenses with such defining powers exist; and that if the productions of those opticians who, in manufacturing their lenses, consider the work they are to perform, and who therefore give to a lens intended for such mechanical purposes as copying, a power to define as accurately as possible a mathematical plane and nothing more, but also give to lenses intended for the production of pictures having different planes of distance, sufficient depth of definition to do the work, when judiciously managed, satisfactorily; if, we say, such lenses are to be stigmatised as bad, then we must confess our conviction that art-photographers will for many purposes decide to use such 'bad' lenses; and, in the interests of art, we can but commend their decision. We may add our conviction, however, that the term 'badness' is in such cases entirely a misnomer, and that such lenses can only be expected from the hands of the very best opticians."

It is a question of secondary importance to the public as to when and how an advantage they acquire had its origin; but as Mr. Dallmeyer, in his recent paper, accredited us with a share in originating and stimulating his labours in a direction which will, we think, advance art-photography, it might have been sufficient to say he ought surely to have known best whence his inspiration or encouragement was derived. Our contemporary, who appears to imagine that the idea of optical diffusion of focus is a thing of yesterday, and that a paragraph published in 1864 anticipated the whole thing, thought otherwise; and it has thus been rendered necessary to glance at some of the facts. We are glad to learn that, two or three years ago, Mr. Taylor did advocate the use of such a power as he mentioned, and glad here to put it on record; and also glad to believe that he will still advocate the proper use of an agency, important in a pictorial sense, in columns where it has been customary to taboo such heresy.

If we had space to recall all the reminiscences of the early history of this subject which crowd upon us, they would fill columns; but we may specifically mention one fact, namely, that years ago Mr. Hughes, also an early "heretic," undertook a journey to Paris in especial quest of "bad" lenses and good portraiture. Bad lenses were common enough, but the "bad" quality which would serve a good end was rare; and he then again found, what he already knew, that a quality exactly adapted to its end could only be obtained in a lens designed for its purpose by a good optician.

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* PHOTOGRAPHIC NEWS, Vol. V. p. 287.

THE MANUFACTURE OF PAPIER LEPTOGRAPHIQUE.

The *Moniteur de la Photographie* gives an account of a recent visit to the *Papier Leptographique* Company's manufactory at Paris. The work is carried on in a large establishment, the upper portion being used for storing the original Saxe paper, and submitting it, after a minute inspection of every sheet, to the preliminary sizing operation. The paper is then dried by an ingenious mechanical arrangement, which allows of a great number of sheets to be hung up for exposure to the atmosphere at one time, the drying and work rooms being totally free from any unpleasant closeness or odour which are inseparable from the manufacture and preparation of albumenized paper. The sheets, when perfectly dry, are placed in the hands of a workman, who, by bending up the four sides of each sheet, shapes them into the form of shallow dishes about a centimetre in depth, and they are then ready to be collodionized.

This last process requires some skill in manipulation, which can only be acquired after constant practice. The sheet, in the shape above mentioned, is placed on a flat, movable board (the sides of the paper dish being supported by slips of wood); the sensitized collodion is then poured into it, and made to run evenly all over the surface, the excess being poured off at one of the angles. The paper is again hung up and dried, and finally passed through a roller and trimming machine to cut off the margins of the paper which were bent up previously to the collodion operation. The sheets are then sorted, and carefully sealed in packets, to exclude the light.

The windows of the establishment are fitted with yellow glass, to prevent the passage of any actinic rays; and adjacent to the workshops is a large chemical laboratory for preparing the materials required in the process.

The elaboration of the process is conducted with the utmost care, and any batch of prepared paper which is not considered of sufficiently good quality is immediately rejected and destroyed. By these means a very superior article of the most perfect manufacture is secured, which, although perhaps somewhat costly in its production, cannot fail eventually to give satisfaction both to the consumer and the manufacturer. At the same time, the Company under whose auspices the paper is made are fully aware as to the necessity of supplying the material at a moderate rate, and have already diminished its price, promising a further reduction very shortly.

The ordinary methods of toning used with albumenized prints may be employed for the *papier leptographique*; but the fixing is best performed with sulphocyanide of ammonium, which, judging from experience already gained, will, no doubt, contribute materially to the stability of pictures produced with the new material.

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A MODE OF PRODUCING BLOCKS AND PLATES FOR PRINTING BY MEANS OF PHOTOGRAPHY.

The following method of photo-engraving has been patented by Messrs. Ramage and Nelson :—

This invention has for its object improvements in the production of blocks and plates for printing. A solution of bichromate of potash, mixed with gelatine, dissolved in water, or other similar preparation, is poured upon a sheet of suitable material, and, when dry, exposed under a negative of the drawing, engraving, or print, for a given time; it is then immersed in water till the parts not acted on by the light swell up to the desired extent. The surface water is then removed, and a solution of gutta-percha, bitumen, and wax, or other such materials, is poured over the surface, forming a skin thereon. The back of this skin is then filled up to a proper thickness with melted wax, or other materials, and, when set, the mould thus produced is separated from the gelatine and electrotyped, or a stereotype cast is taken.

For a copper or other plate, a transparency of the drawing, engraving, or print is used, the same processes gone through, and the plate produced is used for printing in the ordinary way.

Having thus stated the nature of our said invention, we will proceed to describe the manner in which we prefer to perform the same.

A quantity of good gelatine is soaked in cold water until it is completely swelled, and the remaining water is drained off. The dish containing the gelatine is then plunged into boiling water, and so the gelatine is melted. To it there is then added and dissolved in the gelatine as much bichromate of potash or of ammonia as the gelatine will hold without crystallizing, when poured on a strip of glass, and dried. The solution is filtered, and, whilst still warm, it is employed to coat the surface on which it is to be employed. The surface we prefer is of tinfoil. The metal should be about as thick as stout paper, and quite smooth and flat. The gelatine solution is poured evenly over the surface to the thickness of, say, ordinary cardboard, more or less, according to the amount of relief desired to be obtained, and the coating is thoroughly dried. These operations are conducted in the dark. The coated plate is then exposed to light under a negative, by preference on glass, of the design corresponding with the printing block desired to be obtained; it may be a photograph from an engraving, or drawing, or otherwise. The length of exposure will vary, as a photographer will understand, according to the quality of the negative, the thickness of the coating, and the intensity of the light; in bright sunshine, however, it will usually be from ten to fifteen minutes. The exposure being completed, the plate is immersed in cold water till the parts unaltered by the light swell up to the required height, and then the plate is removed from the water, and that which remains on the surface is carefully removed with blotting-paper. The next operation is to form a skin on the surface of the plate, by pouring over it a solution in bisulphide of carbon of one part of asphaltum, three parts of gutta-percha, and one part of india-rubber, which last is dissolved in as small a quantity of benzole as is necessary for the purpose, before adding it to the other ingredients. The quantity of bisulphide of carbon should be such as to reduce the solution to the consistence of ordinary photographic collodion, and the coating of solution is applied by pouring it over the prepared plate, and running off the excess: it sets immediately into a tough, hard skin. Next, the edges of the metal plate, are turned up all round so as to form a tray, which is then filled with a composition consisting of six parts of bees'-wax, four parts of paraffine, and two parts of asphaltum. These substances are melted by heat, and thoroughly mixed. Before the composition is used, it should be cooled, as far as it can be without loss of fluidity. As soon as the composition is completely cold, the tinfoil is separated all round the edges by bending it away from the block, and it is then readily removed, leaving a block with a perfect mould on its surface. This block we stereotype in the manner in which a form of type is usually stereotyped, and so we obtain a surface printing block. Or, with the same object, we sometimes electrotype the mould, as is also well understood, and so we obtain a copper block. Small blocks or stamps to be used by hand are conveniently produced in this manner.

For the production of engraved plates for printing in the manner of copper-plate printing, the process is conducted in a similar manner, the only difference being that a positive of the design is employed in place of a negative; we employ by preference a photographic positive on glass.

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PLAIN PAPER PROCESS.

BY LEIGHTON PINE.*

As the question of how to get good brilliant tones on plain paper is one often asked, but seldom answered to the satisfaction of those in the dark, I take pleasure in sending you the formula with which I have produced as fine results as any I have ever seen, and much better than the results generally produced by other formulæ.

Salting Solution.

Water	1 ounce.
Chloride of ammonia	5 grains.
Citric acid	2 „
Cox's gelatine	1 grain.

Place the ingredients altogether in a bottle, and, after shaking a few minutes, complete the solution by standing the bottle in warm water, or on a sand bath; after which filter. I prefer Saxe paper for printing, which is, in my opinion, the only paper combining all the requisite qualities to insure success. I use a medium thick paper, and, after selecting the smooth sides, I lay the sheets, smooth sides up, on a varnished board, and with a two-inch bristle brush lay on a good coat of the salting solution, and hang the sheets up to dry separately. When dry, place them in a portfolio to keep them from the dust, &c. I find the plan of *brushing* on the salt solution answers as well as the usual plan of immersing the sheets in a large dish; and the saving of time, chemicals, &c., is considerable.

Silver Solution.

Water	1 ounce.
Nitrate of silver	40 grains.

Dissolve, and set in the light until it blackens and clears up, then filter for use.

I pour from one-half to three-quarters of an ounce of this solution in the centre of a piece of paper, on the salted side, and spread it by means of a piece of cotton flannel, held by means of two pieces of glass, taking care to cover every portion of the paper equally; after which hang the paper up to dry. When perfectly dry, fume the paper with liquid ammonia in the usual way, until the paper prints black. Print as deep as for albumen paper, after which wash in three changes of water, and the prints are ready for toning.

Toning Bath.

Plain paper requires much less gold, and tones much quicker than albumen paper, and, unless every precaution is taken, the prints will be spoiled, in a great measure, in the toning bath.

I use half a grain of gold to each whole sheet of paper, neutralized with chalk; the quantity of water is regulated by the size of the toning dish. I mix the bath about an hour before using, and place it in the sunlight or on a stove, until it becomes colourless. If the bath were used before this takes place, it would bleach, rather than tone the prints, and, instead of round, delicately-coloured proofs, we should have flat, grey-looking prints, devoid of everything that goes to make up a beautiful picture. When the toning solution has become colourless, the prints are immersed in it, a few at a time, and kept in constant motion until the redness has disappeared. The prints must not be left in the bath a moment after this takes place, or they will commence to bleach. As fast as they tone, place them in a dish of clean water, and, when the toning is completed, wash them in two changes of water, and they are ready for fixing.

Fixing Solution.

Water...	6 ounces.
Hyposulphite of soda	1 ounce.

The prints will be fixed in about twenty minutes, after which wash as usual, to free them from hyposulphite.

The tone of the prints will be of a rich water colour, and the half-tones most delicately tinted. The image will be on the surface of the paper, and the paper itself in a fine condition to receive colours of any description, or to be worked up in ink. When carefully mounted and well pressed, the true artist will prefer them to the best albumen prints ever produced.

WHAT TO DO WHEN A NEGATIVE HAS BEEN INTENSIFIED TOO MUCH.

BY PROF. TOWLER.*

It is a common mistake committed by young and inexperienced photographers, namely, that of carrying on the intensification of the negative too far; bold contrasts are pleasing to them and very seductive. By degrees the mistake becomes corrected, and they aim then to make the contrast between light and shade more gradual, and, in fact, to introduce what is commonly denominated middle tones. Extreme intensification not only utterly removes all the middle tones, but it blocks up, at the same time, all the fine markings of every description by a species of lateral accretion. Negatives so extremely intensified are worthless, and about them we have not a word more to say. But a negative may by accident be too much intensified and yet not spoiled; all the gradations are there in the negative, but it is impossible to get a print from it endowed with the same amount of light, shade, and middle tone; such a print always has the appearance as if the ground had been covered with snow. Negatives can easily be made in the studio that exhibit none of this offensive snowiness in the print; because there the artist has full command of his light, and can soften down the contrasts at will; but in the field he has no control over the light; and if the prints are to be totally free from this unnatural whiteness, the artist must wait until the sky is clouded. With proper caution and patience, however, even here a negative may be made that will yield a good and respectable print, and such a one as does not always forcibly bring up, in the mind of the beholder, snow. To effect this—that is, to acquire that knowledge of the photographic art so perfectly as to attain this desirable end—we have found there is only one way (this is our experience, others may have succeeded better) by which to prepare the desired negative, and that consists, supposing the light to be right, in producing all the intensity required by development alone.

Notwithstanding every precaution, however, we have negatives that produce brilliant prints, but there is one drawback, there is a little snow on them.

Now, can this evil be remedied without making a new negative?

If the amount of snow is very small, it indicates that the intensification has been prolonged only a trifle beyond what was required; and to remedy this we simply expose the print, when it leaves the printing frame, to the light of the sun until the whites are turned grey; this treatment in general will be found sufficient to soften the contrast, and to introduce a middle shade. But when the snowy whiteness is excessive, and it is desirable to preserve the sky and other parts perfectly white, we proceed as follows:—

We take a print direct from the printing-frame, and, placing it on a slab of glass or marble in a room where the heat is quite feeble, we cut out with a fine-pointed knife all the parts upon which it is desirable that the light shall act, and leave the rest, which correspond to the sky and other white parts, to be preserved white. The skeleton negative is then exposed to sunlight until it is quite black or opaque, and is afterwards gummed or pasted to a piece of clean glass of the same size as the print.

Each print, when it leaves the printing-frame, is then carefully placed under this skeleton negative in such a way as to make the parts correspond, and is then exposed a short time to sunlight until the white parts are all tinged of a grey or violet colour.

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* *Humphrey's Journal.*

* *Humphrey's Journal.*

It sometimes happens that all the parts of a print, excepting the sky, are faultless; in this case we proceed sometimes in the same way; that is, we first prepare a skeleton negative as before, which cuts out all the print, excepting the sky or the parts to be preserved white; but this we paste or gum upon the back of the negative on the parts to which it corresponds.

A second method consists in laying an adequate coating of gamboge upon the back of the negative on the part corresponding to the sky.

In all these operations of preparing skeleton negatives great care and accuracy are required, so as not to encroach upon the confines of the neighbouring parts, nor to come short of those confines. The fact that the skeleton negatives are placed on the back of the original, softens down the abrupt line that would otherwise appear, if they were in direct contact with the print.

Foreign Miscellanea.*

At a recent meeting of the *Académie des Sciences*, M. Moulin described the appearance of a luminous anti-solar disc, of which he was an observer one morning in October last, at sunrise. The disc was composed of bright diffused light, at the extremity of which were apparent three or four prismatic colours in the same order as they appear in a rainbow, and in the centre there was depicted a large shadow of the upper portion of the observer's body surrounded by a bright halo. M. Moulin at first believed this apparation to be an optical illusion, and therefore called the attention of a passer-by to the phenomenon, who immediately recognised it, with the exception that it was his own shadow that he saw reflected on the disc.

The explanation offered by M. Moulin of this curious spectacle is likely to be interesting to photographers. It is well known that in viewing a rainbow, its size depends solely upon the point from which it is seen, and sometimes from an elevated point of view it is possible to see the entire circumference. If, now, we suppose a series of rainbows, one within the other, the outer bands of those in the centre overlapping the inner bands of those nearer the extremity, the colours will be resolved into bright colourless light, and it will be only on the outer margin of this luminous disc that the rainbow colours are at all visible. The shadow observed is due merely to the interception by the observer's body of luminous rays; and as the centre of the disc always appears to be at the point whence it is seen (viz., the eye of the observer), it is very natural that the shadow of the head should be reflected in the middle of it.

M. Mène, who lately communicated to the *Académie* a paper on the blue colour of slags obtained from blast furnaces, has addressed a letter on the subject to M. Chevreul, which concludes in the following manner:—"Some time ago it was stated by Chaptal that the colours of different mineral bodies were due to metallic oxidation, and my recent investigations with iron slags fully substantiate this opinion. The experiments of M. Presier and yourself, with reference to the influence of oxygen on dye colours, likewise corroborate Chaptal's statement, and there is a probability that a pursuance of investigations in this direction may ultimately lead to the production of colours in photography.

Correspondence.

ASHTON'S PATENT.

Sir,—May I be allowed to ask Mr. Samuel Fry a few questions on the subject of his letter to you last week? If so, I will thank him to answer these:—

1. Why should he say that he is much surprised to read that I have patented an invention, which he heard me explain fully nine months ago at your request, Mr. Editor, to some of the leading members of the Photographic Society? It cannot be a sudden surprise.

2. Can he more freely define the meaning of this:—"A method of producing coloured pictures by super-imposing coloured papers on a glass transparency"?

I never saw such pictures, and have certainly not patented that method.

3. Does Mr. Samuel Fry consider himself an authority n *belles lettres*, as he draws a comparison between mine and another of your correspondent's writing, styling mine as "graphic, which reads like a new edition of a well-known tale," whilst he takes the same opportunity of praising the writer of the "Echoes of the Month," by calling him a talented writer?

4. Did Mr. Fry anticipate Mr. Woodbury's discovery? for he says that "his method of executing transparencies in 1858 was identical with Mr. Ashton's, and the results very pretty," and "I have no doubt Mr. Ashton was not aware he had been anticipated in his discovery."

5. How can he be "under the same impression that the talented writer of the 'Echoes' arrived at, viz., that it was one of the large variety of pictures that may be produced by Mr. Woodbury's process," after distinctly asserting that he had produced such pictures in 1858; that the moonlight effect was in continual use; that no particular skill was required; and that he produced stereoscopic views, &c., by the gross, but that now they were of no commercial value.—I am, dear sir, yours respectfully,

Robert Howe Ashton.

Manchester, December 24th, 1866.

Talk in the Studio.

Photo-Relief Printing.—We learn from Mr. Woodbury that the first trials of his new machine for photo-relief printing surpass his most sanguine expectation, both in rapidity and excellence of result. With the first trial machine, using the gelatinous ink, he will be enabled to print at the rate of about twelve 5 by 4 prints per minute. With a fatty ink there is every probability of a similar success, which we hope shortly to record.

Mr. Fry's Enlargements.—We are requested by Mr. Samuel Fry to state that the enlarged photographs which he has recently executed of the Prince de Conde were from an original negative by Mr. Deano, of Richmond, by whom, also, the order was given.

Reproduction of Manuscripts.—A correspondent of the *Athenæum* says:—"The increasing demand amongst literary men and students for the materials necessary to them in pursuing their studies amidst the higher branches of literature, and the difficulties of obtaining access, except to the few who reside within a limited distance, to those original sources of information which are contained in many of the manuscripts preserved in the national libraries of Europe, renders it necessary that some means should be taken to supply the desideratum. I venture to suggest whether this could not in part be effected by photography. If a few important manuscripts were selected, and negatives of them taken page for page, copies could be obtained from these, which, even were they no larger than a carte-de-visite, yet, if carefully taken, would, by the aid of a common reading-glass, become of the greatest service to many who at present are unable to consult the originals; and thus, at a trifling expense, almost fac-similies might be possessed, not only by our many public libraries, but also be brought within the reach of a numerous class of students and others who, debarred by present difficulties, would gladly avail themselves of this opportunity for studying and comparing some of the most valuable documents contained in the various European libraries. Nor would the advantage thus produced end here; it would tend, by giving a greater impulse to the reading and deciphering of ancient manuscripts, to perfect the knowledge of our historical sources, and, at the same time, faithful copies of the text would be preserved of many precious manuscripts, so that in the event of any accident ever occurring to the originals, the severity of the loss would thus, in some slight measure, be mitigated."

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* *Comptes Rendus.*

The Paris Exhibition, &c.—A correspondent says: "As many photographers who have prepared specimens for the Paris Exhibition may possibly, from various causes, decline sending pictures, it will perhaps be of interest to them to learn that the public buildings at Penzance, the most improved and improving place in the three Kingdoms, are intended to be opened, in the early part of the approaching summer, with various great displays; amongst others, a Fine Art Exhibition, under the auspices of the Mayor, Town Council, Committee of the Government School of Design, the Natural History and Antiquarian Societies, &c. Now, as the public rooms in the large block of buildings are amongst the finest and most convenient specimens of modern design and handicraft; and as it is believed the Fine Art Committee who will superintend the arrangements of the proposed pictorial display will be glad to avail themselves of contributions from first-class photographers; and as photographers cannot often get such magnificent and well-lighted rooms for the display of their productions, it will answer the ends of both parties to co-operate early; and further information will be furnished in reference to the above."

Reducing Prices Decidedly Foolish.—A correspondent says:—"Photographers who find trade at all slack should endeavour to revive it, not by reducing the remuneration they receive, but by aiming at the introduction of such *novelties and improvements* as will give the public an increased desire for their work. I can mention a photographer in a small western provincial town who has, from the very first introduction of the C.-D.-V. pictures, charged 2s. 6d. for the first, and 1s. 6d. for every subsequent copy. He always finds plenty to do. Many of his customers try the cheap operators, but one trial proves to them the fact that the clean, careful, and artistic proofs from the high-priced man are in the end cheaper and more satisfactory than any of the low priced 'dodges' that some operators foolishly and unthinkingly resort to. The French style of colouring is beginning to be talked about, and a western operator is about negotiating with the Parisian inventor, and intends introducing the same applied to cabinet pictures in the west; a good move, and one very likely to be successful and remunerative."

To Correspondents.

⁂ The Year-Book of Photography for 1867 is now ready, price One Shilling; by post, One Shilling and Twopence. Besides the calendar, information on Societies, and a complete epitome of the practice of photography, in its most improved form—as recognized by the best authorities—the Year-Book for 1867 contains a large number of original articles on important subjects, by the ablest and most distinguished photographers. Amongst others we may mention the names of T. R. Williams, Dr. Anthony, Mr. Mudd, Mr. H. P. Robinson, Mr. Jabez Hughes, Mr. England, Mr. V. Blanchard, Mr. Walter Woodbury, Mr. O. G. Rejlander, Mr. J. H. Dallmeyer, "The Old Photographer," Mr. J. Spiller, Mr. Samuel Fry, Mr. J. W. Swan, Mr. Nelson K. Cherrill, Mr. H. Butter, Mr. A. Keene, Mr. W. Crookes, Mr. H. Cooper, jun., Mr. F. W. Window, and other gentlemen. Epitomized accounts of new and modified processes, patents, tables, &c., also appear, the volume constituting an exceedingly full and complete compendium of the present state and practice of photography, as stated by its ablest representatives.

One who studies the "News."—Hyposulphite of soda may be kept in solution, ready for use, without any injury. The meaning of the constant instruction given to use "fresh hypo" is, that it must be a solution which has not before been used for fixing prints; not necessarily that the solution is fresh made. When once a solution of hypo has been used for fixing prints, and therefore contains hyposulphite of silver, it is very liable to decomposition, and it is not safe to fix prints with it again. 2. It is rather beneficial than hurtful, in preparing a solution of hypo for use in very cold weather, to use a little warm water. The process of dissolving hypo is always attended with a fall of temperature, the freshly-made solution being intensely cold. If the weather be cold at the same time, the extremely low temperature of the solution prevents the proper chemical action taking place, and there is great risk of imperfect fixation. The addition of an alkaline carbonate is also useful in preventing the risk of forming sulphide of silver. Carbonate of ammonia is best for the purpose. 3. As a general rule, chloride of gold and chloride of lime can be kept many months without injury, especially if kept in the dark. 4. The best modes of intensifying, and the propriety of following one method by another, much depend on circumstances. It is a good plan to intensify with pyro and silver before fixing, whenever the negative appears to want it; then if, after fixing, a little more intensity is required, use mercury, or other of the various intensifying agents you may choose. But bear in mind this general rule: if a negative have the slightest appearance of under-exposure, always intensify before fixing; if it appear over-exposed, the flatness and weakness consequent on over-exposure may be removed by intensifying after fixing. Intensifying after fixing generally tends to increase contrasts, the deposit, as a rule, under such circumstances, accumulating on the lights in greater proportion than on the half-tones. This is the rule; but it is not without exceptions. 5. A collodion plate excited, washed, and dried, will sometimes yield an excellent negative, but the success of the operation depends much on the quality of the collodion and on the nature of the sensitizing salts. Some samples of collodion will not yield any result. The presence in the collodion of a large proportion of bromine is generally necessary to success. 6. The process is uncertain, and we cannot recommend it. 7. The lighting generally is pretty good; a little too directly in front, in some cases, as in 4 and 5 for instance. Avoid scrupulously the spotty effect of the tablecloth in No. 4. Thanks for your kind wishes.

H. Hansen.—It is quite impossible to estimate the value of paper clippings, as it must vary from a variety of causes besides the strength of the bath. The value of chloride of silver depends much upon its perfect purity. Pure chloride of silver contains about three-fourths of its weight of metallic silver, and is therefore worth that much, less the cost of reduction in the crucible. Metallic silver is worth about 5s. 6d. per ounce.

Hereford.—Your question as to the best method of "glazing coloured photographs on paper" is rather indefinite. Do you mean coloured in water colours? Do you mean glazing by rolling, or by what is termed enamelling, or by varnishing? If our own judgment were asked, we should say it was the best thing to leave a water-coloured picture unglazed, as one of its especial beauties depends on the absence of glaze. If you wish to make it look like oil colouring, a varnish may be applied, but it should receive a sizing of gelatine first, which must be applied with skill, to avoid disturbing the water colours. Or you may coat with a solution of gelatine or gum arabic, and then coat with collodion. Or you may apply the principle of "enamelling" with gelatine and collodion applied to a plate of glass, which has repeatedly been described in our pages. In all cases, however, use care, if you apply an aqueous solution, not to disturb the water colours previously applied.

Educator.—We believe that there is no English copyright in Kaulbach's designs to "Reynard the Fox," and that you may exhibit transparencies of them without risk of breaking the law or injuring any copyright interests.

M. D.—We regret exceedingly our inability to supply or point out a mode whereby you can obtain the collodio-chloride print in question. We devoted all the time we could by possibility secure from our literary duties, during a few months, to the perfecting of the collodio-chloride process, and the prints exhibited in Dublin were produced in the course of our experiments. Since then we have never had time for the production of further pictures by the process, all our time for practical photography being absorbed by experimental duty. We have not a copy of the especial print you mention, the copy returned from Dublin having been given to the gentleman from whose negative it was printed. Should we find time for preparing material and working the process again for picture-making purposes, it will afford us pleasure to remember your wish.

Merthyr.—The amount of citric acid used in conjunction with pyro for intensifying depends much upon temperature. In cold weather very much less is necessary than in hot weather; and the gentleman you name, in common with all photographers of judgment, modify the formula to meet the circumstances of the season, &c. 2. Your questions as to the Gordon modification can only be determined by experiment.

A. Faike.—Thanks: but we find no enclosure in your letter.

Bristolian.—Yes. We believe from 20 to 22 feet. The maker will tell you accurately.

R. G. L.—We never apply any preliminary coating in using the collodio-chloride on opal glass. An edging, about one-eighth of an inch broad, of a solution of wax in benzole, applied to the film after exposure and before toning, &c., prevents the film leaving the glass.

P. W. F.—A thick paper will generally require longer immersion in the hypo than a thin paper; but if the hypo be strong enough—one ounce in five of water—and the solution not too cold, a quarter of an hour or twenty minutes will generally be long enough.

W. C.—Cards might be coated with collodion as you suggest, prior to mounting prints, in order to preserve prints from contact with any traces of hypo in the card; but we are doubtful whether it would be altogether efficient, and the operation would be troublesome to carry out on a large scale. It is better to test one or two of each batch of cards, and reject them if any trace of hypo is found. The addition of castor oil would make collodion tough, and for such a purpose would not injure it.

A. Z. B.—It is not possible to produce a 12 by 10 negative from a quarter-plate glass positive in every way as sharp as the original. In all enlargements there is some loss of sharpness; but it is quite possible to avoid *offensive* loss of sharpness. In our experience a No. 1 triple is best for the purpose, but a good portrait lens with small stop will answer well. 2. For solar camera direct printing the same formula as for ordinary printing will answer. For development printing the best formula with the working of which we have any personal familiarity is, for salting the paper:—bromide of potassium, 7½ grains; chloride of ammonium, 4½ grains; gelatine, 3 grains; water, 1 ounce; a 50-grain silver bath, with 1 minim of acetic acid in each ounce. Expose wet until a trace of an image is visible; then develop with a 4-grain solution of gallic acid. Take great care that no trace of actinic light reach the picture during the operations, except that passing through the negative to form the image. We do not know of any firm from whom the prepared paper can be had.

Received.—*Marmor Homericum*, photographed by Stephen Thompson. We shall notice these admirable photographs of a work difficult to deal with in our next.

E. L. Wilson.—We have just received the box with its charming and interesting contents, which we will duly examine and acknowledge at an early opportunity.

Several Correspondents in our next.

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